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## THE COVER

The picture on the cover, a small reproduction of which appears above, shows the Albion, N. Y., plant of Snider Packing Corp. The photograph was taken when the plant was in the midst of its tomato catchup season and was working at night. Snider has its headquarters in Rochester, N. Y., and has plants in Illinois, Indiana, Maine, New York and Texas.

# FOOD INDUSTRIES


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# This Issue

## Yes, It Looks Different

By the time you get to this page you will have noticed something different about this issue of FOOD INDUSTRIES. But don't get excited. The difference is in appearance, not in editorial content. Two things are outstanding in the change. The first is the different type faces used and the new arrangement of headlines. The second is the grouping of feature articles under appropriate functional headings, such as Quality Control, Production, Engineering, Materials, Markets and Management. The reason for the changes is to make FOOD INDUSTRIES easier for you to read. The new style was created by Walter Dorwin Teague, well-known designer.

## Cure for Label Headaches

Every food manufacturer doing an interstate business has suffered at least one good headache during the last three years as a result of trying to figure out what he ought to put on his labels. Many new, and often not well-defined, requirements were introduced with the new Food, Drug and Cosmetic Act. So as a cure for label headaches Gordon W. McBride prepared the article, "How Shall We Label It?" on page 55.

## Defense Against Oxygen

The development of a tallowy flavor in butter has long been a problem for the dairy industry. This off-flavor condition is attributed to auto-oxidation of the butterfat, a reaction catalyzed by heat, light, moisture, acid and enzymes. But recent research has indicated that this quality deterioration can be impeded by the use of an antioxidant, a sirupy cereal concentrate. W. J. Corbett, and P. H. Tracy, of the University of Illinois, and C. N. Hansen, of Beatrice Creamery Co., tell all about it in an article starting on page 34.

## Double-duty Controls

Elimination of the human factor has been the motive behind most developments of automatically controlled processing equipment. And this was the reason why Heinrich Frings developed his "Automaton" vinegar generator, a fully automatic generator described on page 47 by Joe Lowy. Mr. Lowy, who was associated with the inventor in Europe for years, tells how the new generator was not only successful in eliminating the troubles that vinegar makers had experienced from faulty operation, but shows how other advantages followed from the new invention: Increased output from a given amount of raw material, higher quality, greater flexibility of operation and saving of floor space in the factory.

# Coming

## New Ideas from Britain

Eric Hardy, the Englishman who has been keeping readers of FOOD INDUSTRIES posted on wartime developments in the British food industries, has some more to say. In an article to appear in an early issue he will bring you up to date on the wartime progress made by food manufacturers in England. Many interesting developments have been made.

## Food Demand and Prices

Too often, prices in the marketplace bear little or no relation to actual supply and demand. This being true, and food prices now being in the midst of a period of rapid rise, some investigation of the supply and demand conditions now prevailing are in order.

Federal crop estimates and U.S.D.A. reports give a good idea as to the general supply situation, and every report indicates that abundance is the rule with almost every staple food.

But what of demand? It is greater. But how much greater no one knows. But demand—present and prospective—can be analyzed and the basis for an estimate established. See FOOD INDUSTRIES next month.

## Quality That Keeps

Having, with care and pains, produced a food product of the desired quality, the food manufacturer naturally wants to hold that quality until the product is consumed. Physical changes, such as separation of suspensions, breaking of emulsions, or the growth of ice crystals in frozen products, must be inhibited.

To accomplish these ends, food processors have developed suitable "stabilizers" which serve at least to retard the undesirable action for a reasonable time. What these stabilizers are and what they will accomplish will be discussed in next month's FOOD INDUSTRIES by W. C. Cole, of the College of Agriculture, University of California.

## Cold-process Jelly

Many improvements in the manufacture of jelly have resulted from the work carried out at Delaware Agricultural Experiment Station under the direction of George L. Baker. FOOD INDUSTRIES has been privileged to record many of these advantages. In fact, in this issue, Mr. Baker has an article on the effect of pectin decomposition.

In September, FOOD INDUSTRIES will add another to this useful series when Mr. Baker and his collaborator, M. W. Goodwin, will show how it is possible to make a high-quality cranberry jelly by a cold process—one that omits the usual boiling of the fruit pulp and sugar solution.

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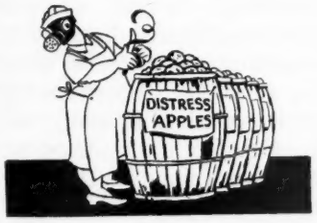
FOOD INDUSTRIES
FOR THOSE WHO CONTROL QUALITY
THROUGH MANAGEMENT AND PRODUCTION

LAURENCE V. BURTON, Editor AUGUST, 1941

# The Talk of the Industry

● Canadian government officials regard war as the major industry—from now on. They have no tentative ideas of the duration of the war. Every move is based on an indefinite continuation of fighting. Whether the U. S. enters the war or not, our own domestic economy will inevitably be forced into line with that policy.

● It always takes a stranger to ferret out the oddities of a great city. A recent first time visitor to New York from a far-off apple-growing district discovered a form of business that is quite new to us. He was seeking the desires of the market for canned vs. frozen apples and ran into a concern that buys up only local distress or overripe barreled fruit, peels and slices




it, under conditions that he described as rather unpleasant, and can undersell all comers.

● An unpardonably gullible friend recently attended the National Nutrition Conference for Defense and actually believed some of the pronouncements from the higher authorities on nutrition about the virtues of whole-wheat bread vs. the use of synthetic vitamins. Accordingly he went in heavily for whole-wheat bread. After a week of this diet he was sent to a hospital, ultimately discharged and forbidden thereafter ever to eat whole-wheat bread. The episode cost him more than $200.

So much for the newer knowledge of nutrition and the horrors of "devitalized" foods.

● Up to now nobody has made much of a point about the effect of labor-saving power driven devices upon human nutrition. Somehow the idea continues to persist that our lessened need for energy food intake is tied up with much of the so-called deficiencies of vitamins in our daily food.

● For some time we have been waiting for some wag to point out that Great Britain's problem of food is merely a failure of distribution. With plenty of food in South and North America, as well as New Zealand and Australia, and a good potential market in Britain, we see no reason why the dramatics of total war should obscure the vision of those who like to explain many of the domestic woes of mankind as a mere failure of distribution.

● In order to protect the brewing industry from the old alibi of drunken drivers that all they had was a "couple of bottles" of beer, the United Brewers Industrial Foundation has been giving wide publicity to the "alcoholometer" recently announced by Greenberg and Keator of Yale University in the *Quarterly Journal of Studies on Alcohol*, June, 1941.

The person being tested simply exhales into a sterile mouthpiece, the

operator pushes a button in the apparatus that is plugged into an ordinary wall socket, eight minutes later reads the meter, and the truth is known. The meter gives a reading in percentage of alcohol in the blood.

After which, you do or do not lose your license and end up in the hoosegow.

● After several months of speculation on the problem of proper food for troops near the equator, the inquiry has been made pointless by the garrisoning of Iceland by U. S. military forces. If the President can outguess this department to such an extent, perhaps he can outsmart Hitler.

● "How do you go national?" inquired a stranger on the phone. After much discussion it was learned that she had made a big success of a food business in a small town and now wanted to "go national"—"how do you go about it?"

"Do you have cash resources of

$500,000 to $1,000,000?" she was asked.

"What would I need that for?"

"To go national."

"If I had that much I would not need to go national."

And there you have the current version of an age-old wheeze.

### The Procedure To Get Equipment You Require

Leon Henderson has two very difficult jobs as head of OPACS. One is price control; the other is civilian supply. And in the matter of civilian supply his effort must be aided and supplemented by those who supply civilian needs. The problem his office faces is that of properly evaluating the needs of those who supply the civil population as compared to those industrial concerns who supply the national needs for the materiel of war.

Food for the civil population here and for Great Britain is just as much a wartime necessity as munitions, planes and ships, although it is far less spectacular. That the government is definitely committed to the proposition that adequate nutrition is essential to a defense effort is amply shown by the National Nutrition Conference for Defense. But the manifold activities, nutritional and otherwise, of the Social Security Administration are not officially identical with those of the civilian-supply end of OPACS. Consequently, there is a gap between the two that must be bridged, and it is up to the food manufacturer himself to help bridge that gap.

Increasing demands on the food manufacturer are causing increased requirements for repairs, replacements and new equipment. These can only be supplied by the equipment manufacturer, but he is facing great difficulty in getting the necessary materials to satisfy these needs of the food processor. In the case of seasonal products and perishable foods, which pretty nearly includes the entire food industry, the problems are becoming grave. In time they will become acute. And later on, if any perishable raw materials or processed foods are lost or wasted, the problem will become tragic.

For these reasons it is vital that the OPACS folks must understand and sympathetically comprehend the food aspect of civilian supply. Also, they must realize that considerable advance planning is required, for there is no way to prevent the deterioration of raw or perishable foods other than their manufacture, or their preservation by refrigeration, by sterilization, by fermentation or by dehydration. Nature does not wait on man—or on the food industry.

Constructive thinking on the part of OPACS is developing. Those who are in charge evidence a desire to help and cooperate, but the problem facing them is huge and complex. Plainly, OPACS needs all the help it can get.

#### *Food Men Should Help*

This help can come best from those who are active in the food industry, working through their several trade associations, and should be sincere without any effort to obtain an undue advantage. For a food manufacturer to work alone is of small moment. OPACS needs advice on what amounts of equipment a branch of inlustry normally purchased in prior years, what is needed now and special reasons why it is needed, and why certain materials must be used (like stainless steel where it is required by local health regulations) instead of possible substitute materials.

Trade associations should supply a classification of the lists of purchases that will show their relative importance so that special priority treatment may be intelligently applied. It will, however, be of no use at all to

# Hors d'Oeuvres

• *"Rookie Cookies" for the soldiers are on the market. Now some enterprising bakery ought to bring out "Yoo-Hoo" cookies for the rookies who have a special weakness for cookies. A picture of a golf course would make an appropriate trademark.*

• The Fishery Council says there is butter in butterfish. The "butter" is the low price. By that definition there is no butter in butter.

• *When Texas was a frontier state, firemen received no pay, but the man whose house they saved always bought them a keg of beer as a reward. Even in those early days a foamy fluid was used to get fires put out.*

• According to the U. S. Fish and Wildlife Service, the brown rat can jump vertically to a height of 25 in. Then why not hang a baited noose two feet above every rat hole in your warehouse?

• *Well, it had to come sooner or later—someone is selling the holes in doughnuts. A restaurateur in Myrtle Beach, S. C., deep-fries the dough balls evicted to make doughnut holes, and people buy them.*

• The scallop is a funny fish. It has ears but cannot hear, eyes but cannot see and a mouth but cannot speak.—Veritably, the scallop is the three little no-evil monkeys, all in one.

• *Beer is being used to aid the blind. Part of the taxes levied against it go for that purpose. And yet there are those who would return to Prohibition and the kind of alcoholic beverages that make people go blind.*

• A new chemical, penicillin, elaborated by the penicillium mold that grows on bread, is said by medical authorities to be the most powerful nontoxic germ killer ever discovered. Maybe there's a new outlet coming up for bakers' stale returns.

• *A canner in Madison, Ind., has written a letter to each Congressman urging the government to reimburse him and other canners for the loss suffered as a result of the use of canning-crop land for defense purposes. Each letter was sealed in a tin can for mailing. The government will probably fill the cans with I-O-U alphabet soup and return them.*

• "Drink More Milk!" some government people are urging. "Save Milk for Britain!" other officials are demanding. And now the dairy industry is trying to invent the cake that you can eat and have too.

• *Reams of statistics are published by the food industries to show the housewife what happens to her food dollar. But the principal concern of the housewife is that her dollar is gone.*

• American Institute of Baking has just published its "New Glamour Recipes." The publishers should have called this "Tested Yoo-Hoo Formulas."

• *More than 100 large freezers have been loaned by British ice cream manufacturers to the Ministry of Food for producing gland extracts. But then the ice cream companies no longer have any use for the freezers, for food rationing has taken the cream out of ice cream in England.*

• Uncle Sam's soldiers are getting twice as much milk as the troops did in World War I. Let's hope it helps them to make the world twice as safe for Democracy.

• *The aluminum pots and pans donated by housewives to the cause of defense will permit construction of more than 2,000 fighting planes or 500 heavy bombers. But think of the offensive force of all those pots and pans if they were still in the hands of housewives.*

*F. K. L.*

state that every purchase is essential unless you can produce indisputable evidence that this is true.

In this way OPACS will then be in a position to grant to the food manufacturer and his supplier a suitable priority rating that will be in accordance with the urgency of the needs.

OPACS has the final say-so, and unless the food industry helps itself by aiding OPACS, the problems of proper supplies may not be solved. It's up to the food manufacturer to act now.

In counseling such action, we are aware of the continuous relief (A-10 rating) for maintenance and repairs for the food processing and storing industry, and the temporary (A-2 rating) relief granted to the canning industry and the A-1-A rating to its breakdown repair requirements.

## Price Control By Intimidation

Thurman Arnold appears to be running a little side show of his own in his multiple indictments of various groups of food processors and trade associations. One suspects that he has no actual intention of going through with any of his various threats to prosecute those whom he alleges are violating the antitrust laws by various methods. Unfortunately, however, he has the resources and legal talent of the Department of Justice at his command and can force business to spend large sums of money to defend itself. There is no foretelling when such a threat of a suit may become an actual legal attack.

He has learned through the long experience the New Deal affords that a threat to sue can accomplish almost as much compliance with his will as an actual judgment in favor of the government.

It must not be forgotten that he is a close personal friend of Leon Henderson of OPACS, who has been trying to hold prices down without specific authority from Congress.

### *The Fear Technic*

On the other hand, in our many rambles around Washington we have discovered a growing tendency to anticipate that business will get off the reservation if given half a chance, and that therefore the government should scare business away from "temptation" by whatever means are available. One means is the Congressional committee investigation. It has proved to be effective in instilling fear, irrespective of the possible guilt of parties investigated. Another very effective means is the indictment or threat of indictment when the Department of Justice has no real intention of following it up with a vigorous prosecution. We have actually heard Mr. Arnold chuckle with glee over the way he had forced a one-cent drop in bread prices in Philadelphia or Baltimore by the route of the indictment.

His theory seems to be that he can force business to go the route he wants it to go if he will cause enough agitation. But he is unfair in never giving an apology or a clean bill of health to those whom he indicts but does not try. It is unfortunate that the mass of the electorate are too ignorant of jurisprudence to distinguish between an indictment and a verdict after a fair trial.

The most recent attacks on the food industries are not only unfair but are downright reprehensible, for he threatens to prosecute many firms and organizations for collaborating and complying with the requests of other branches of the Federal government.

The country would be much better off if Mr. Thurman Arnold were dumped into the refuse can and the lid clamped down tightly.

## Signs of the Times In Food Packaging

With the *Business Week* Index of Business Activity climbing steeply to ever higher figures—more than 50 percent above the 1923 to 1925 base and more than 25 percent above 1940—it is obvious to the thoughtful man that there are important problems ahead for the food manufacturer even though he is not engaged in munitions manufacture. Obviously there are limits somewhere, temporary though they may be. It is these limits and the results that may arise from their removal that portend many technical problems of supply, substitution and costs—which is not to ignore other equally important problems of wages, strikes, price control, taxes and the fortunes of war. Nor does it overlook the activities of Thurman Arnold who likes to shake the big stick and watch the boys scamper—and drop their prices.

Problems of packaging of foods will soon be on the very active list. How soon, is anybody's guess. If you are able to predict the dates of the outcome of the war between Germany and Russia, between Germany and England, or what Japan will do or even what the United States will do, or how many ships will be sunk in the ocean, you will be able to plan your moves with a fair degree of confidence. In the absence of such predictions, it is necessary to depend on the signs of the times for hints of the things to come.

### *Rubber Growing Scarcer*

Rubber comes to the United States in ships, and ships are very scarce. In fact they are becoming scarcer. Synthetic rubber cannot yet supply the deficiency caused by ship sinkings.

In this country the rubber reserves are a nine-month supply. Canada has about a ten-month supply. Rubber rationing is soon to begin if, indeed, it has not started by the time you read these words. While the foregoing are said to be the official figures, if you divide the 339,108 tons on hand on June 30 by the 84,912 tons consumed in June you will see that probably the U. S. has only 4 months supply on hand.

To operate a food plant on a restricted rubber supply can present a series of problems, the like of which you may never have conceived. For this reason it is imperative that the utmost care of rubber goods should be exercised.

Tires for automotive equipment present a huge demand for rubber, and the plan is to reduce the percentage of rubber in new tires. Proper care, proper inflation and careful driving will conserve rubber.

Every manufacturer of foods should study his rubber uses to see that maximum conservation methods are installed. Check over your belts, hose, gaskets, aprons, gloves, and the like, to be certain that nothing is wasted or allowed to deteriorate in any way that can be prevented.

### *Cork Problems*

Not long ago the OPM priorities division forced a cut of 50 percent in the use of cork as a result of shortage of supply in the United States. In turn, this has arisen from shipping problems, for nearly all cork comes from Spain. Furthermore, a very destructive fire consumed large quantities in storage in an eastern city within the year. While cork's principal use in industry is for thermal insulation, such as pipes, tanks and rooms,

it has many other functions, some of which are very important to packaging, such as a limited use of highest grade cork in certain operations in stamping out die-cut cartons—a use for which there is no satisfactory substitute material. Cork is sometimes used for liners for bottle closures, but this is not an important problem, for other materials can be used for liners.

Manufacturers of cork lined crown closures are advising their trade that only a 30-day supply of crowns may be kept on hand as a result of the OPM restrictions. But in the alcoholic-beverage field, the use of cork must be curtailed, which will bring new competition for closure material to food manufacturers.

Cork is used in so many obscure places that its rationing may result in many an unexpected surprise.

### *Metal-foil Problems*

Despite many previous assurances from suppliers that aluminum foil would always be available, many who use this foil for technical packaging purposes rather than for enhancing the package's appearance are seeking a substitute material before the supply is entirely shut off. Properly made aluminum foil is airtight and light and moisture-vapor proof. The choice of a proper substitute, however, involves more than technical matters, for rigid metal or glass containers require different production equipment and labels. And there is also the inevitable freight problem to be evaluated. Wm. Wrigley, Jr., Co.'s much publicized gesture of abandoning foil wrappers for chewing gum and the sale of a large stock of pig aluminum for defense purposes was a far-sighted move to make a virtue of necessity.

### *Paper Problems*

Take paper and paper board—the basis for labels, cartons and many types of food packages. Production of paper board has been running from 75 to 90 percent of capacity of the mills, but unfilled orders have been increasing rapidly. Shortages of casein, chlorine, formaldehyde, glue—also problems encountered in getting high-grade electrotypes for label printing—have been reported as some of the reasons why the backlog of orders has risen from one week's production to nearly three weeks' output. Paper production in the United States is running much closer to capacity, even reaching 101.3 percent in the week of June 28. (It was lower in the following week because of the holiday.)

In addition to the foregoing are certain developments in Canada, from which much of our paper stock comes. Canada is creating munitions and ship-building industries that demands an all-out effort. Repair shops in pulp and paper mills with their huge lathes for machining paper-machine rolls are all busy on heavy marine work such as propeller shafts, crankshafts and the like. If a paper machine breaks down it does not seem likely that ship construction will be sidetracked to favor paper manufacture.

It appears likely, therefore, that many paper-packaging problems will soon face the food manufacturer. And it is also likely that the possible shift to paper packages by those who have heretofore used other materials will not make the overall problem any easier of solution.

### *Tin Problems*

While there is no shortage of tin for tin plate or tin-coated containers, there is always the potential problem of a sudden stoppage of supply. This can arise from two sources: Japan may interfere, or scarcity of ships may prevent imports. Presumably there is an adequate reserve of this metal to carry us for a short time, but there is no agreement of opinion as to how long it would last. When this department began to investigate the tin problems in May, 1940, those who knew the most about it not only ridiculed the study but many put every conceivable obstacle in the way of getting an accurate summary. And about 125 out of 126 food manufacturers who were queried about their plans in case of a tin shortage asserted that "it can't happen here!"

Today the amount of tin on the tin plate used in cans for many nonacid products is reduced from 1.5 lb. per base box to 1.35 lb. as a result of a government order. And every manufacturer of tin cans is moving heaven and earth to provide a satisfactory tinless container. Though the problem has been theoretically solved, *i.e.*, a method has been devised, it is far from a practical solution. Important engineering, supply and production problems in the fabrication of tinless containers still remain, and some of them are said to require revolutionary changes if the tinless container is ever needed. Furthermore, the cost to the can manufacturer of a possible change-over will be stupendous, and it is doubtful if any can company can make the hypothetical change without generous financial aid, presumably from the government. Another problem in connection with tinless containers is the fact that the rate of production may possibly be materially slower.

A sign of the times here is that, in Canada, lard pails or drums made from tin plate are forbidden.

### *Glass-container Problems*

The glass-container industry has been alert to its opportunity and has stepped up its production to 22.3 percent above its 1940 production for the first five months of this year. While no official figures are available as to the percentage of total capacity of the industry that is being utilized, the calculation has been made that it is now running at about 90 percent of capacity on the assumption that all nonfood container molds have been replaced by food container molds on the glass-blowing machines. If this replacement has not been made, then the industry is now running very close to 100 percent of capacity as far as containers for foods are concerned.

One sign of the times is that deliveries of new milk bottles to certain dairies were falling behind orders in June. The delays were not serious, being only a matter of a day or so.

### *So What?*

The best advice to follow is to appoint someone to concentrate on packaging problems if you do not already have a packaging specialist in your company. He should be given a suitable place to work and experiment, be given freedom to travel and investigate, and should be instructed to be always ready with tested plans for substitute packages to meet the ever-changing situation of supply and demand.

Instructions to the packaging specialist should cover not only the technical phases of the package itself, but a survey of additional equipment needed, additional supplies, adequacy of sources of such supplies, and costs, including freight charges both in- and out-bound. And above all, he should consider where your company would stand in a stampede if everybody else facing comparable problems should also attempt to apply the same solution or utilize the same substitutes.

# THE TECHNICAL STOOGE

By A. M. ZENZES
Mexico City, Mexico.

**While it is unfortunate to be a forgotten man, the point of this story is not so much to put the salesman's technical man "Jeeves" on a pedestal as to suggest a solution to a situation in the food industries.**

THE overemphasis put upon the salesman in today's highly industrialized food business may be a hang over from yesteryear. Or it may be the result of a desire to compensate for the humiliating treatment which, unfortunately, salesmen must endure outside their own offices. Whatever the reason, this custom seems to be on the way out together with the "secret formulas and recipes" of a generation when food industries were only kitchens.

Today's elaborate food products are sold in a much different way than yesterday's staples. A car of dextrose going to a bakery or a car of soybean flour going to a meat packer may be "creditable" to the corporation lawyer who legalized the use of the new product, to the chemist who invented the new process or to the advertising agency that created the demand for the new raw material. Thus the role of the salesman may often amount to no more than that of a messenger. Is it any wonder, then, that interior corporation politics revolve largely around the question: "Who gets the credit?" (Or: "Who gets the blame?")

### *The Technical Stooge*

The million dollar sales in the food industry are not always made merely between the sales managers and the purchasing directors. Theirs is the order-clerk routine, repeat order business on a large scale.—"How many cars shall I put you down for this time?"

The real sale, the small opening wedge through which large orders are to flow, is made between two unknown men—one man behind a kettle who is in a position to say: "Yes, I can use the stuff!" and one man without title who can give instructions on how to use it. What goes on immediately before and after these two men make the decision for their companies is a great deal of ballyhoo.

The following is typical of conditions within our industry and it will serve to illustrate the sales department's supremacy over the technical staff of a company:

Salesman Smith runs into a technical sales problem which is over his head. "We'll just wire the home office," he says to the purchasing agent, "and they'll have the dope for you in no time." So he wires:

JOHN DOE MFG. CO.
ATTENTION SALES MANAGER

PLEASE WIRE CARE JONES BROKERAGE COMPANY HOW TO DISPENSE SUGAR IN PECTIN ALSO STATE HOW TO INVERT CANE SUGAR

SMITH

Of course this is sheer nonsense. What Smith really wants to know is the proper procedure for dispersing pectin in a liquid using sugar as a dispersing agent. And why does salesman Smith want to know about this anyway? Obviously, the correct answer will help him sell his goods. In fact, let us assume the correct answer is a condition to the sale of the material.

After some interdepartmental commotion a wire is sent to Smith stating that the information cannot be furnished in writing but that a "technical man" will be available to demonstrate the procedure in person.

### *The Kid Glove Technic*

Now, all salesmen hate to have other departments talk to *their* customers. This innate jealousy is perhaps better understood if one keeps in mind that *their* customer is not the firm as a whole, but Mr. Purchasing Agent, or Joe, the warehouse man, or the girl who phones the orders. That tendency to immunize their customer from all infectious contact is not restricted to the technical man. It includes all departments, and even the president, who may be permitted to view the customer once a year around Christmas time, in the company of the sales manager and a quart of the best whiskey. And the salesman will hold his breath all the time for fear the president might "step on something." Salesmen live in constant fear that something might make their buyer mad. And they are right. A company in the Middle West recently stopped all purchases from a large starch manufacturer because the buyer's name, something like "Symskovicz," was misspelled on the mimeographed mailing list.

Salesman Smith, too, wants to keep his buyer free from contamination, so he wires back:

Cartoonist's conception of the technical stooge making a sale through the medium of a salesman.

SORRY THEY DONT WANT TECHNICAL MEN IN THEIR PLANT PLEASE SEND DOPE IN WRITING AM HANDLING THIS ACCOUNT WITH KID GLOVES

SMITH

So our technical stooge, by a dictum of the salesman, is relegated to the role of an ineffectual ghost writer. The "sales angle," whatever that is, has decided a matter of vital importance for two manufacturing companies. If things turn out well, the salesman will get the glory. If not, the blame will be put on the man who wrote down the information. Will the company ever know to what competition it has lost this business? No. Because nobody knows about this raging competition between the sales department and what is known as the "technical end."

### *The Sales Angle*

The sales angle measures 360 deg. Everything falls within its radius, as if it had the force of gravity. When all arguments fail, the problem is hauled within the perspective of the sales angle and it shrinks or it grows, depending upon the angle. Viewed from the sales angle the technical man becomes the invisible man. The controversy, however, does not exist in that small number of well-organized companies whose laboratory heads have jurisdiction over their purchasing departments.

Our problem is that of progress: How to sell a new product over the head of our own salesman to the man standing behind the purchasing agent. An unusual get together, to be sure, comparable to a meeting between two Charlie McCarthy's. The salesman has his place in the field of distribution and competitive selling. He has no right to pose as a food technologist by plagiarizing the experience and wisdom of experts which an antiquated system has placed under his jurisdiction. Let us free ourselves of the false notion that being in the food manufacturing business means being in the grocery business. And let us reserve a well-defined sphere of action for the technical men who pilot food sales to a point where the salesman can take over.

The "sales angle"' is a fetish which used primarily to safeguard the privileges of the salesman. The witch doctors who cast the spell do not know any more about the real meaning of the angle than we do. For that reason it is used to justify anything.

Witch doctors can be caught at their own game only by giving them another evil eye. How about the "technical salient" or the "technical sphere"—or better still, why not debunk the whole thing and give each group of experts their proper share of the angle?

### *Father Confessor*

When the technical man has made his way into a plant he is like a doctor who is called in to take a look at a sick patient.

He gives free medical advice in exchange for complete confidence, and many are the sins and secrets to which this father confessor must lend his ear. He is generally received as a suspicious character, a wolf in sheep's clothing, who is out to get the secrets of his victims. There are numerous manufacturers who do not permit any technical men to enter their plants. It is the traditional attitude of the small craftsman who has learned his trade from his forebears. He wants to protect his knowledge, which is often his major stock in trade. There are others who will furnish their formulas slightly altered to be on the safe side. There are some to whom the technical man is the most welcome visitor, and whose doors are always open to him. These as a rule, are the successful, progressive firms.

Can our father confessor really pledge himself to professional discretion? Under the usual arrangement, working as the salesman's stooge, he enters the plant incognito by the back door. He will meet a man who is known only by his first name and who expects, first of all, two 10-cent cigars. Their deal is very swiftly made: "You having some trouble with the batch? Well, tell me how you do it, and I'll tell you how to do it better."

Each one of the two gets his share of the bargain in the shape of information, the man at the kettle usually getting the better share. Is it fair to expect our father confessor to dismiss everything from his mind? Maybe this piece of practical knowledge will make another patient happy some day, in some other part of the country.

What right has the sick manufacturer to expect secrecy from our technical man who was not even permitted to deal directly with that manufacturer, but was shunted over to some subordinate employee? Does the manufacturer pay for this service? No! Here is the very core of the whole problem. Technical service is "bootlegged" by our salesman into the plants where he needs support for his selling job. More power to him. But could not a way be devised for open recognition by both sides of the valuable and costly technological service? And should it not be possible to effectively correlate this service with sales? A salesman is apt to keep his technical stooge running in and out of the back door for ten days in order to get some business which will not pay for that service in five years. And when the purchasing man says: "Thank you," our generous salesman answers: "Don't mention it. Have a cigar!"

### *Technical Service And Unfair Competition*

Let us consider the case of a sugar refiner or a manufacturer of salt, starch or flour. All of these are basic products. There is nothing known about granulated sugar today that was not common knowledge yesterday. Still, these manufacturers are spending tremendous sums of money to support their sales departments by solving all the manufacturing problems of their customers. This attitude, called "bending over backwards," is not found in other parts of the world. In this country, where secret rebates and price discrimination are forbidden, there is no law to prevent giving costly favors in the form of technical service.

This bill for technical service is presented annually to our food manufacturers by their own salesmen and by unscrupulous buyers. There is no other country on earth where a man may go into business without knowing a thing about it. Here all he has to do is get a sample of his competitor's product, call in salesmen from all potential suppliers and say: "This is the stuff I want to make."

Ten or twenty laboratories get busy, technical men make trial batches with free samples of raw material, and suddenly our man is in a business of which he knows nothing. He may, if he is fair-minded, give each a tenth or twentieth of his total purchases—or he may drop all of them in favor of a pal with whom he plays pinochle.

There are other openings for unfair competition and for shaking down the manufacturer. One of them is created by the plant superintendent or foreman who does not know his business. He will lean heavily upon technical service from the supplying companies, but will keep this a secret from his own company and his own purchasing agent. The suppliers are in a squeeze, no matter what they do. If they refuse to play ball with the superintendent, he is likely to put thumbs down on their product. If they give the service, they will not reap the rewards, for the purchasing man knows nothing about their work.

A soft drink manufacturer in the Middle West once found that his product turned cloudly in the bottles. He dispatched a letter to each of his supply houses putting the blame on their raw materials. A buyer in carload lots, he insisted upon returning the cars to his suppliers on both the Atlantic and Pacific seaboards. The suppliers were on the spot. Bacteriological records showing that their material was free from organisms when

shipped was of no avail. To prevent the loss of all future business, a technical man was sent on a long trip, and after a week of systematic search it was discovered that mold organisms from a plant next door were settling down upon the stock of bottle caps, which were not sterilized and which transferred the mold to the product. There were profuse apologies. The bottler had received a free lesson in soft drink manufacturing. The innocent Pacific Coast supplier paid the bill—or else! Or else—why not stop bootlegging technical service?

"I want to make this stuff. Tell me what it is and how to manufacture it. Then send a sugar salesman around."

### *Sales Without Order Numbers*

It is an interesting paradox that the biggest selling job in the food industry is not done by the sales managers. We refer to that big sales meeting in Washington, where all competitors talk at the same time to one single customer: the United States. 130 million consumers cannot buy and 100,000 salesmen cannot sell until a lawyer, assisted by our technical stooge, has convinced another lawyer, representing the government, that the product is, or makes, pure food within the meaning of the law. While the sales manager chalks up another car of assorted cases at the home office, he leaves this tremendous job in the hands of two nincompoops (as far as salesmanship is concerned)—the man from the attorney's office and the man from the lab. What has happened? Why are the sales managers always absent from the important Washington hearings? Maybe they cannot be bothered with technical details? Maybe they cannot sell if the buyer is not interested in price, carload allowances and cash discount? Maybe their conspicuous absence in Washington defines their real function as order takers better than any profound analysis?

But here is a theory: To the sales manager everything pertaining to expert knowledge of the business, be it in the vast understructure of manufacture or in the superstructure of legal matters and economics—to him, all this is known as "technicalities." Whatever that is. Technicalities must be attended to by the technical men, of course. According to definition. Just as salesmen, according to definition, are the boys who sold the goods. So the technical men suddenly find themselves in the role of experts on all matters labeled "technicalities" in the front office. Important matters of purely economic portent are tossed into the lap of the technical man, whether major Federal legislation is concerned or such problems as labeling provisions, weights and measures. The technical man is there to fight it out.

Here again we find our T.M. in the role of a really creative salesman, selling not a car or a contract but entire industries for many years to come. His is the fundamental salework; he opens the gates wide to a new flow of merchandise, leaving it to the clerks to ladle it out later.

If our technical man is the salesman's stooge at home, he is, as a rule, promoted to the role of attorney's stooge in Washington. There are exceptions, of course. But usually the management of the Washington scene belongs to the lawyer, since industry does not equip itself with the same kind of specialists the government has —technical experts with legal training, or lawyers with a specialized training in food technology or economics. The biggest selling job in the food industries is done by two end runners of jurisprudence and technology, with no support in between. There is a vital stretch which neither one of the two can cover. Under the quick crossfire of the Washington "sales talk," hastily scribbled notes or hurriedly whispered information have no punch. What does the lawyer do if, suddenly, the argument requires a knowledge of the saturation relations of a system of different sugars? What does the technical man say if the right answer depends upon a thorough knowledge of the drawback provisions of the Tariff Act?

### *My Man Jeeves*

There are the directors who sit on the board, there are the assistant credit managers who thumb through Dun & Bradstreet, there are the directors who direct the traffic of the elevators in the building. They all have labels. Titles. But our technical man works incognito when he sells ten years' worth of production at Washington. He has no name when he goes in by the back door of the bakery, while the salesman sits on the front counter creating good will by talking to the telephone operator, saying: "There goes my technical man!"—It sounds as if he said: "There goes my man Jeeves!"

The processing and manufacture of food is continuing its swift advance toward complete industrialization. This will demand a clean-cut definition for the "technical man," his duties and his responsibilities. Perhaps it would help the cause if this forgotten man were first of all lifted out of his anonymity and given a name. Any suggestions?

### *The Answer*

This is not written merely to help out our forgotten man. A solution to the problem will benefit most of all the manufacturers and the industries who are paying heavy toll to the present unhealthy system. It is obvious that the sales business calls for a division, both in organization and personnel, of distribution, competitive selling and technological selling. Working under their own technical sales manager, these men would be in a position to use in their sales work the established practical and dignified methods of their profession. There is no place for ballyhoo in industrial sales work.

With such a division of work and personnel effected, the technical service might be changed from a racket into something resembling fair competition.

# QUALITY CONTROL

Cereal Sirup Preserves Butter Flavor • How Refrigerated Locker Plants Obtain and Retain Quality • Sources of Contamination in Fresh Crabmeat • Short-time Sterilization Kills Spoilage Spores • Digest of AMS Standards

# Cereal Antioxidant Prevents Tallowiness In Butter

By W. J. CORBETT and P. H. TRACY
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**Cereal concentrate proves effective in retarding off-flavor development and in improving keeping quality of butter. It is used in three ways—in cream, in salt and on wrapper.**

DEVELOPMENT of off-flavors can be retarded and the keeping quality of butter improved through the use of a sirupy cereal concentrate, it has been indicated by tests.

When the concentrate was added to sweet (No. 1) cream in the proportion of 0.15 to 0.3 percent of the fat content of the cream, the development of oxidation flavors in susceptible butter was retarded. When it was added to sour (No. 2) cream in the proportion of 0.1 to 0.3 percent of the fat content of the cream, the score of the resulting butter was improved as much as one point and the butter usually had less of an "old cream" flavor.

When the concentrate was added to the butter by incorporating it in the salt used during "working," the keeping quality of the butter was improved. The improvement was most noticeable during the early part of the storage period.

When butter prints were wrapped in vegetable parchment sized or surface-treated with the concentrate, development of surface off-flavors was retarded and the keeping quality of the interior butter was improved. Also, when the treated vegetable parchment was held in boiling water or a hot saturated brine for bactericidal and fungicidal purposes, it lost less of its antioxidative properties than when subjected to formaldehyde.

### *How Antioxidant is Made*

The cereal concentrate used is a commercial product made by the Quaker Oats Co., Chicago, and submitted to us for study by the Musher Foundation, New York, N. Y. In its manufacture, a suspension of finely ground cereal flour in water is permitted to stand until the insolubles settle out and the supernatant liquid can be drawn off. Concentration is carried out under partial vacuum to give a final product containing 70 percent total solids and having a consistency appearance and odor similar to that of molasses.

In determining the results obtained, both treated and untreated butter were scored together as paired samples. That method of judging was regarded as giving a truer picture of results obtained than would judging of random samples. The judges were unaware of the identity of the samples at time of the scoring.

Under various conditions of commercial procedure in butter making a tallowy flavor develops in the butter. This flavor defect is identified as "rancidity" by some investigators. "Tallowiness" is the term more commonly used with reference to dairy products because of the resemblance to the flavor and odor of spoiled tallow. Development of this flavor defect is attributed to an autoxidation of butterfat. The chemical reaction producing the off-flavor is catalyzed by such factors as heat, light, certain metallic ions, moisture, acidity and enzymes.

Since copper has been definitely shown to catalyze tallowiness in dairy products, the butter made from No. 1 cream was made susceptible by the addition of a copper salt solution to the cream before churning. This addition, under controlled conditions, was in order because, in general, creamery operations afford many opportunities for copper contamination, as there are usually many exposed copper surfaces with which the cream might come in contact during passage through tinned copper vats and coolers.

Development of tallowiness in creamery butter would probably be more prevalent if the biological activity that takes place in the cream before and after it reaches the creamery did not have beneficial effects. Studies[1] have shown that tallowiness in copper-contaminated cream can be retarded by holding the cream at an incubation temperature of 72 deg. F. The same cream held at 40 deg. F. gave butter with a distinct tallowy flavor.

### *Previous Research*

Results of previous studies have also shown that the addition of certain agents known as antioxidants tend to retard or prevent the development of oxidation flavors in products containing fat. One study[2] showed that the addition of finely ground oat flour improved the keeping quality of butter. Other studies[3,5] indicated that the addition of oat flour or a water extract of it to cream retarded the develop-

Sirupy cereal concentrate used as an antioxidant in butter.

ment of oxidation flavors in the resulting butter. These same investigators[3,5] reported that butter wrapped in vegetable parchment sized with a suspension containing oat flour had less surface off-flavor than butter wrapped in untreated wrappers. Results of a fourth study[4] showed an improvement in the keeping quality of butter made from cream containing a hexane extract of oat flour or when packaged in a wrapper treated with the hexane extract.

Results of these previous studies encouraged investigations in which the use of the cereal concentrate, as well as a special butter salt and vegetable parchment, was studied in connection with the manufacture of butter on both a laboratory and commercial scale.

### *Experiments with Sweet Cream*

In the tests with sweet cream, several runs were made in the laboratory. The concentrate was added to the cream previous to pasteurization at 150 deg. F. for 30 minutes. The cream was then cooled and held overnight before churning. Addition of copper sulphate solution, when added, was made after the cream had been pasteurized and cooled. Churning was done in a 50-lb. capacity combination churn and butter worker.

The data for the various trials are given in Table I. For the most part the butter to which the concentrate was added had better keeping qualities than the control butter. The improvement in score was generally ½ to 2 points. In a few instances, however, the control was scored the same as the treated sample or a fraction of a point higher. These results indicate that the cereal concentrate did not have enough antioxidative effect to prevent the occurrence of oxidation flavors but did retard the development of this defect. The concentrate exerted an antioxidative effect in the control cream as well as copper-contaminated cream when the butter was susceptible to oxidation. In these trials, from 0.1 to 0.4 percent (on a fat basis) of the concentrate was used. Whereas the larger quantity usually produced somewhat better results than the smaller, it is reasonable to expect that the stability of the fat, in some cases, would be such that the smaller quantity could be used satisfactorily.

To check reports from various commercial manufacturers of No. 2 grade

**Table I—Effect of Cereal Concentrate Upon the Keeping Quality of Butter Made From No. 1 Cream.**

| *Sample* | *Butter score* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Fresh | | 13 days | | 21 days | | 40 days | |
| TRIAL 1 | No Cu | 2 ppm Cu | No Cu | 2 ppm Cu | No Cu | 2 ppm Cu | No Cu | 2 ppm Cu |
| Control | 92.5 | 90.0 | 92.5 | 88.5 | 92.5 | 89.0 | 90.5 | 88.0 |
| 0.4% conc. on a fat basis | 92.5 | 90.0 | 92.25 | 89.5 | 92.0 | 89.5 | 90.5 | 89.0 |

| TRIAL 2 | Fresh | 9 days | 13 days | 21 days |
|---|---|---|---|---|
| | | *1.5 ppm Cu added to all samples* | | |
| Control | 91.0 | 90.5 | 88.5 | 87.0 |
| 0.15% cereal conc. added on fat basis. | 91.5 | 91.5 | 90.0 | 88.0 |
| 0.25% cereal conc. added on fat basis. | 92.0 | 92.0 | 0.5 | 88.5 |

| TRIAL 3 | Fresh | 14 days | 23 days |
|---|---|---|---|
| | | *0.5 ppm Cu added to all samples* | |
| Control | 90.0 | 89.25 | 89.5 |
| 0.1% cereal conc. added on fat basis at the churn | 90.5 | 89.5 | 89.5 |
| 0.3% cereal conc. added on fat basis before past | 91.0 | 90.0 | 90.0 |

| TRIAL 4 | 3 days | 12 days | 25 days | 40 days | 53 days |
|---|---|---|---|---|---|
| | | | *No Cu added to any of the samples* | | |
| Control | 90.0 | 89.5 | 90.5 | 89.5 | 88.5 |
| 0.4% cereal conc. added on fat basis. | 92.0 | 90.5 | 91.5 | 90.5 | 89.0 |

**Table II—Effect of Addition of Cereal Concentrate to Second Grade Cream on Score of Butter.**

(Concentrate added to cream on fat basis.)

| Trial | Sample | *Butter score ** Fresh | *Butter score after ** 2 weeks | 4 weeks |
|---|---|---|---|---|
| 1 | Control | 89.00 | 89.0 | ..... |
| | 0.3% conc | 90.00 | 90.0 | ..... |
| 2 | Control | 88.20 old cream | 88.0 | 88.0 |
| | 0.3% conc | 88.40 old cream | 89.0 | 88.5 |
| 3 | Control | 88.00 old cream, onion | 88.25 | 88.0 |
| | 0.25% conc | 88.75 old cream, onion | 88.65 | 88.5 |
| 4 | Control | 88.50 old cream | 88.0+ | 88.0 |
| | 0.25% conc | 89.00 old cream | 88.0 | 88.0+ |
| 5 | Control | 88.30 old cream, onion | 88.5 | 88.5 |
| | 0.1% conc | 88.75 old cream, onion | 89.5 | 88.5+ |
| 6 | Control | 88.5 old cream | 88.5 | 88.5 |
| | 0.163% conc | 89.0 old cream | 89.0 | 89.0 |
| 7 | Control | 88.0+ old cream | 88.5+ | 88.5 |
| | 0.08% conc | 88.0 old cream | 88.5 | 88.5+ |
| 8 | Control | 88.5 old cream | 88.65 | 88.5 |
| | 0.08% conc | 88.5+ old cream | 88.85+ | 89.0 |
| 9 | Control | 90.0 | 90.0 | 90.0 |
| | 0.25% conc | 90.0+ | 90.0+ | 90.0+ |
| 10 | Control | 89.0 metallic flavor | 89.5 | 89.5 |
| | 0.163% conc | 90.0 | 90.0 | 90.0 |

* The scores given are the average of the authors.

**Table III—Effect of Cereal-concentrate-treated Salt on Keeping Quality of Butter.**

| | *Butter Score* | | | | | |
|---|---|---|---|---|---|---|
| TRIAL 1 | Fresh | 10 days | 18 days | 29 days | 34 days | 58 days |
| Control salt (2.5%) | 91.5 | 90.5 | 90.5 | 90.5 | 90.5 | 89.5 |
| Treated salt (2.5%) | 91.5 | 91.5 | 90.5 | 90.5 | 90.0 | 90.0 |

| TRIAL 2 | Fresh | 4 weeks | 6 weeks | 12 weeks | 16 weeks |
|---|---|---|---|---|---|
| Control salt (2.5%) | 89.5 | 90.5 | 90.5 | 89.0 | 89.0 |
| Treated salt (2.5%) | 91.5 | 91.0 | 91.0 | 89.0 | 89.0 |

| TRIAL 3 | Fresh | 15 days | 37 days | 60 days |
|---|---|---|---|---|
| Control salt (2.5%) | 89.0 | 89.5 | 90.0 | 90.0 |
| Treated salt (2.5%) | 89.5 | 90.0 | 90.5 | 90.25 |

butter that addition of cereal concentrate to sour cream improved the body and flavor of their butter, a preliminary test (trial 1, Table II) was run to determine if any beneficial effects could be observed under controlled conditions. The cream used had a titratable acidity of 0.93 percent as lactic acid and was graded as No. 2. It was neutralized to 0.28 percent acidity and split into two batches. One batch was kept as control. To the other batch, 0.3 percent of cereal concentrate was added, calculated on the fat content of the cream. The creams were pasteurized at 150 deg. F. for 30 minutes, cooled, held overnight and churned in a 50-lb. capacity churn. The butter scores are given in Table II.

The butter to which the concentrate was added was given a point higher score than the control. The improvement was so marked that further trials were made in a commercial creamery. In trials 2 to 7 inclusive, 1,100-gal. batches of No. 2 grade cream were split into two lots. The cream was neutralized with NaOH to approximately 0.25 percent acidity. One lot was left as a control. To the second lot, cereal concentrate was added. Both lots were pasteurized at 150 deg. F. in a vacuum pasteurizer, cooled, held several hours and churned in 1,000- to 1,500-lb. capacity churns. The scores of the butter given in Table II show that there was approximately ½ point improvement in score when the cereal concentrate was used. The indicated improvement was because the control butter usually had a more pronounced old-cream flavor than the treated butter.

Explanation of what is present in the concentrate that is responsible for the improvement noted in the score of the butter is difficult. Since an improvement in flavor was observed in the fresh butter, some chemical change evidently takes place during processing.

### *Use of Treated Salt*

Effects of using salt containing cereal concentrate are given in Table III. For these trials, approximately 40 lb. of washed butter granules from a large churning were transferred to the small churn. Salt and water were added and the butter worked. This was done for both types of salt (treated and untreated). Different butters were used for each trial. The butter to which the treated salt was added scored approximately ½ point higher in most instances. In trial 2 there was no difference observed between the treated and control butters after they had been held over 10 weeks, which suggests that the protective action of the treated salt may be gradually lost during prolonged storage of the butter.

The treated salt was made by drying a mixture of commercial butter salt with the cereal concentrate to give the finished salt an 0.8 percent by weight content of concentrate solids.

### *Treated Wrapper Tested*

To determine the effect of cereal-sized parchment paper upon the development of off-flavors during storage, regular University Creamery pound butter prints were wrapped in oat-flour-treated vegetable parchment and regular vegetable parchment. The butter was printed one to two days after churning and, after wrapping, was placed in paraffined cartons and stored at the temperatures indicated in Table IV. The surface of the butter as well as the inside was scored for flavor. New prints were used for each scoring.

The treated wrapper was made by sizing vegetable parchment in an oat-flour solution. Sets of parchment were supplied by three different manufac-

(Turn to page 74)

**Table IV—Effect of Sizing Vegetable Parchment Paper with Oat Flour on Keeping Quality of Butter.**

| Trial | Sample | Butter Score: Fresh | | 2 weeks | | 4 weeks | | 6 weeks | | 8 weeks | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Plug | Surface | Plug | Surface | Plug | Surface | Plug | Surface | Plug | Surface |
| 1* | Control | 88.0 | 88.0 | 87.5 | 87.0 | 88.25 | 86.5 | 88.25 | 87.0 | 87.75 | 86.0 |
| | Treated parchment | 88.0 | 88.0 | 87.75 | 87.5 | 88.5 | 87.75 | 88.5 | 88.0 | 88.0 | 86.0 |
| 2* | Control | 89.75 | 89.75 | 88.65 | 88.25 | 89.0 | 88.5 | 88.25 | 87.5 | 88.0 | 87.5 |
| | Treated parchment | 89.75 | 89.75 | 88.85 | 88.65 | 89.0 | 88.75 | 88.5 | 88.0 | 88.5 | 87.75 |
| 3* | Control | 88.75 | 88.75 | 88.75 | 88.5 | 88.0 | 87.0 | 88.0 | 87.0 | 88.0 | 86.0 |
| | Treated parchment | 88.75 | 88.75 | 88.75 | 88.5 | 88.75 | 88.0 | 88.75 | 88.25 | 88.5 | 88.0 |
| 4* | *Brand A* | | | *1 month* | | *10 weeks* | | *15 weeks* | | *19 weeks* | |
| | Control | 89.5 | 89.5 | 89.0 | 86.5 | 89.0 | 86.0 | 89.0 | 86.5 | 89.0 | 87.0 |
| | Treated parchment | 89.5 | 89.5 | 89.5 | 88.0 | 89.0 | 87.0 | 89.0 + | 87.5 | 89.0 + | 87.5 |
| | *Brand B* | | | | | | | | | | |
| | Control | 89.5 | 89.5 | 89.0 | 86.5 | 89.0 | 86.0 | 89.0 | 86.0 | 89.0 | 86.15 |
| | Treated parchment | 89.5 | 89.5 | 89.5 | 88.0 | 89.5 | 87.0 | 89.0 | 86.0 | 89.0 + | 86.35 |
| | *Brand C* | | | | | | | | | | |
| | Control | 89.5 | 89.5 | 89.0 | 86.5 | 89.0 | 86.0 | 89.0 | 86.0 | 89.0 | 87.15 |
| | Treated parchment | 89.5 | 89.5 | 89.5 | 88.0 | 89.5 | 87.0 | 89.0 | 86.25 | 89.0 | 87.35 |

* Butters in trials 1, 2, and 3 held at 32–36 deg. F. and trial 4 (a,b,c) held at 0 to 5 deg. F.

**Table V—Effect of Different Treatments Given to Vegetable Parchment Paper on Score of Stored Butter.**

| Sample | Fresh | | 1 week | | 2 weeks | | 4 weeks | | 6 weeks | | 8 weeks | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Plug | Surface | Plug | Surface | Plug | Surface | Plug | Surface | Plug | Surface | Plug | Surface |
| Trial 1 | | | | | | | | | | | | |
| A | 90.5 | 90.5 | 89.5 | 89.0 | 89.0 | 88.5 | 89.0 | 88.5 | 88.5 | 87.25 | 88.25 | 87.0 |
| B | 90.5 | 90.5 | 89.5 | 89.0 | 89.0 | 88.5 | 89.0 | 88.5 | 89.5 | 87.75 | 89.0 | 87.75 |
| C | 90.5 | 90.5 | 89.5 | 89.0 | 89.0 | 88.5 | 89.0 | 88.5 | 89.0 | 87.75 | 88.25 | 87.25 |
| D | 90.5 | 90.5 | 89.5 | 89.0 | 89.0 | 88.5 | 89.0 | 88.5 | 89.25 | 87.0 | 88.5 | 87.5 |
| E | 90.5 | 90.5 | 89.5 | 89.0 | 89.0 | 88.5 | 88.0 | 87.5 | 88.0 | 87.0 | 87.0 | 86.0 |
| Trial 2 | | | | | | | | | | | *11 weeks* | |
| A | 90.5 | 90.5 | 90 | 89.0 | 90.0 | 89.0 | 89.0 | 88.0 | 89.5 | 88.5 | 88.5 | 86.5 |
| B | 90.5 | 90.5 | 90 | 89.0 | 90.0 | 89.0 | 89.75 | 88.75 | 89.5 | 88.0 | 89.0 | 88.0 |
| C | 90.5 | 90.5 | 90 | 89.0 | 90.0 | 89.0 | 88.5 | 88.0 | 89.25 | 88.0 | 89.25 | 88.0 |
| D | 90.5 | 90.5 | 90 | 89.0 | 90.0 | 89.0 | 88.5 | 88.0 | 89.25 | 88.0 | 89.0 | 88.0 |
| E | 90.5 | 90.5 | 90 | 89.0 | 90.0 | 89.0 | 88.75 | 88.5 | 88.5 | 87.5 | 88.25 | 86.0 |

A — Control parchment.
B — Cereal-sized vegetable parchment.
C — Cereal-sized vegetable parchment held in boiling water 30 min.
D — Cereal-sized vegetable parchment held in hot sat. salt solution 30 min.
E — Cereal-sized vegetable parchment held in formaldehyde solution; 1 oz. formalin to 2 gal. water.

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# How Locker Plants Control Quality

By H. H. PLAGGE.*
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**Methods used to obtain and retain quality in frozen fruits and vegetables when stored in refrigerated lockers—selection of product, preparation, processing, packing and labeling.**

SEVERAL steps are vitally essential to the successful preservation of fruits and vegetables in refrigerated locker plants. The logical order of the steps prior to freezing are as follows: (1) Selection of product, (2) preparation for processing, (3) processing, (4) packing, (5) labeling.

### *Selection of Product*

Some fruits and vegetables are not suitable for freezing preservation in lockers, while those that are suitable do not yield equally desirable products. Celery, lettuce, tomatoes and onions are important garden crops that are not adapted to freezing. Orange juice and other citrus fruit juices cannot be satisfactorily preserved in refrigerated lockers. Asparagus, spinach, sweet corn, snap beans, lima beans, broccoli, peas, rhubarb and carrots are important vegetables that preserve especially well by freezing. Strawberries, raspberries, red cherries, blueberries, dewberries and peaches are important fruits that result in excellent frozen products. Some fruits and vegetables that are frozen less frequently are apples, apricots, plums, prunes, pineapples, cranberries, beets, turnips, kohlrabi, squash, cauliflower and brussels sprouts. Thus, there is quite a long list from which we may choose. This is fortunate because high-quality products are frequently not available in all kinds of fruits and vegetables every year. For example, we may have excellent spinach and strawberries but poor asparagus available in one season, and the reverse situation in another season. Climatic conditions are usually responsible for variations in the quality of products.

In selecting, select a good variety that is known to give good results. This is especially important in peas and strawberries. More often, however, one can choose any good high-quality variety that will thrive well in his section of the state. In some instances it may be a matter of using the variety that will grow well in a given location. The Henderson lima bean does not yield the highest quality obtainable. However, the Henderson is more widely adapted than most other varieties. Therefore, this variety may be the best choice in many localities. Similar situations seem to exist with the Dunlap strawberry and the Latham red raspberry for certain localities of the Mid West. Your state experiment station can give the information regarding adaptable varieties for your locality.

In selecting products, one must also select for proper maturity and condition. A rule that is good to follow is to select the product at the stage when it is best for table or dessert use. Corn, peas, snap beans, spinach, lima beans and asparagus are very perishable and change in quality rapidly at summer temperatures. Unless cold storage at 32 to 35 deg. F. can be provided until the next day, it is best to pack these products and freeze them the same day they are harvested. The same holds for the berry fruits. Peaches, apricots, apples, carrots, pineapples and squash have considerably more storage capacity; therefore, a short delay will do less harm. In certain cases a delay to permit ripening and quality to develop is recommended. Peaches, for example, are frequently too green to freeze when they arrive on the market, and may require a day or two to reach full "eating ripe" stage. Peas, snap beans, corn, asparagus and berry fruits are frequently selected for freezing in an overmature stage. When such is the case, the product will be lacking in proper texture and in flavor.

* From a paper presented at the Kansas Frozen Food Locker Conference, April 23, 1941.

To obtain quality in frozen products, vegetables must be well grown. At the left, peas; at the right, spinach. These crops yielded excellent frozen products.

Packed containers should be labeled with the variety, pack, date, locker number and similar information. An orderly arrangement in the locker conserves time and space.

### *Preparation for Processing*

Preparation for processing precedes actual processing and is similar to the preparation necessary in canning. Washing in a cold, "stiff" spray of water should generally be done before other operations. A spray nozzle arrangement attached to a faucet is ideal for removing sand and soil from strawberries, spinach and similar products. It is not impossible to home-pack a frozen spinach product free from sand and grit. Thorough washing, and this often means double washing, is important. An inexpensive sloping table covered with sheet metal can be set up so that wash water will drain into a sink. The arrangement makes for simplicity, saving of time and efficiency in handling products.

Sorting, trimming, cutting, slicing, shelling, pitting, dicing and peeling are done according to the requirements of the product and the desires of the processor. Overmature things should be separated out, and, if processed at all, should be kept apart from the better materials. Likewise, green or immature products should not be used.

### *Processing*

All vegetables, with the exception of rhubarb, require a brief scalding treatment in boiling water. In order to keep the scalding water at boiling temperature, 4 to 5 gal. of water should be used at one time for only a pint or less of vegetable. For corn (which is best scalded on the cob) and for spinach and like bulky greens, 10 gal. of boiling water is the smallest volume that can be most satisfactorily used. When 10 gal. or more of scalding water is used, a scalding basket similar to a refrigerator tray can be filled with corn or spinach, and a large quantity of material can thus be treated at one time. To keep 10 gal. or more of water boiling, a 15 gal. wash boiler can be used and set over two burners on the stove. Five gallons of water can be kept boiling by using an ordinary 7- or 8-gal. canning kettle on a single burner. The scalding basket should be set on a wire rack in order to support it at a convenient height in the scalding water. This arrangement is simple and easily set up. Suitable scalding baskets are available and are preferred to cloth bags. The latter may contribute to bodily injury from burns and the wasting of hot water and fuel.

After scalding, the vegetables should be cooled immediately in a large pan of cold water. The water should be cold, and should be kept cold, by allowing some water to flow through the cooling pan. A simple cooling arrangement can be readily arranged when a sink and running water are available. Leave vegetables in the cold water a few minutes, or until they are cold, but no longer.

The processing of fruits consists mainly of mixing the fruit with sugar or sirup. Fruits require no precooking, but peaches can be more easily peeled when they are dipped in boiling water a few seconds. The time will vary from about 10 to 60 seconds, depending on maturity, fruit temperature and variety. Peaches so heated should be cooled immediately in water before the peeling is done. Strawberries can be frozen whole or in crushed or sliced form. Mixing with dry sugar preserves the flavor better in strawberries than packing in sirup. Sliced peaches, apricots, pineapples and whole raspberries are best preserved by packing in a heavy sirup of approximately 50 percent.

### *Packing*

Vegetables can be packed fairly tight in containers, but some space (at least $\frac{1}{4}$ in. in pint containers and $\frac{5}{8}$ in. in quart containers) should be allowed for expansion due to freezing. Covering the packed vegetable with a weak brine solution for locker storage is especially desirable for peas, snap beans, asparagus and carrots. Because spinach does not drain readily, it is practically a liquid pack whether brine is added or not. Lima beans and corn seem to be about as good in quality when packed without brine. Some, however, consider the flavor of the brine pack better in these vegetables.

There are many types of containers that are suitable for locker products. Whether the container should be airtight is still undecided for some products, but the answer to the question will probably depend on such factors as the kind and quality of product, storage temperature and period of storage. Since most containers are round in form and since none of the square types are available in airtight form, it may be said that the ideal container for lockers is not yet available. Containers for lockers should be oblong in shape and fit in lockers like bricks in a wall or books on a shelf, but they should also be liquid-tight in posi-

One of the steps in freezing preservation is packing. Right, snap beans being packed in jars. Left, the packs being covered with weak brine. Two scalding baskets, cut beans ready for scalding, and time clock for measuring scalding interval are in foreground.

tions other than upright, and, for some products at least, airtight. Containers for lockers that meet these requirements are not available.

### *Labeling*

After packing, the containers should be labeled so that the product can be identified as to kind, variety, pack, date, owner or locker number, and so forth. Abbreviations or brief descriptions such as "3+1," "Brine," "Straight," "4-1-41," "S Beans," "K. Wond.," and so on, may be used on a small label. Gummed labels adhere well to glass but not to tin unless an additional adhesive such as adhesive tape is put over them. It is advantageous to keep records of the products put into the locker, in order to check on what types of products and on what types of treatment are preferred.

# Rigid Sanitation Required in Packing Fresh Crabmeat

By C. S. McCLESKEY and LEONARD TOBIN
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**Because fresh crabmeat is more sensitive to contamination than most foods, it has made more evident the necessity of guarding against bacteria in every operation. Many of the precautions necessary constitute good practice for other food manufacturers.**

FOOD manufacturers, as well as the consumer public, are becoming more and more conscious of the importance of microorganisms in food products. It often happens, however, that the producer, processor or manufacturer of foods is unaware of the extreme importance, from the standpoint of bacterial contamination, of some apparently trivial step in the processing or handling of the product. If the finished product is to be of the highest possible sanitary quality, every step in its production, processing, packaging and handling must be carefully analyzed as a potential source of undesirable microorganisms in the food.

The packer of fresh crabmeat, perhaps more than most food processors, must be extremely alert to the possibilities of bacterial contamination, or he may suffer considerable losses. Truly, "eternal vigilance is the price of freedom" from losses due to early spoilage or to seizures by the State or Federal government. The finding of the fecal organism, *Escherichia coli*, in fresh crabmeat in interstate commerce results in the condemnation of the product by the Food and Drug Administration. Also, careless methods in processing or handling result in losses due to a more rapid spoilage of the crabmeat; the product fails to keep as long as it would if there had been less bacterial contamination. The total number of bacteria, and the incidence of the Escherichia-Aerobacter (coliform) group of bacteria in freshly packed crabmeat is shown in Table I.

### *How to Keep Out E. Coli*

But how can the spoilage bacteria, and particularly *E. coli*, be kept out of crabmeat? With this question in mind, let us examine the various steps in preparing the crabmeat for the market. Between the live crab and the can of ice-cold, delicately flavored crabmeat there are several steps which are exceedingly important from the standpoint of bacterial contamination. Let us start with the live crabs squirming on the sorting table. On them, and in their digestive tract, are millions of bacteria, including perhaps considerable numbers of the spoilage types and the outlawed fecal *E. coli*. The first step in the processing of the crabs consists of cooking in boiling water or in a live steam retort. The heat of the process should be sufficient to destroy *E. coli*, any disease producing bacteria which may be present, and most other bacteria as well.

### *Bacteria From Human Hands*

The first opportunity for the addition of bacteria to the cooked and cooled crab is offered at the next operation. Human hands remove the claws and open the crab. Human hands also pick the meat from the claws and body of the crab. If the hands are not scrupulously clean large numbers of bacteria and, worst of all, fecal bacteria, *E. coli*, may be added.

The bacteriological examination of the hands of a considerable number of crabmeat pickers has indicated that this is one of the important sources of *E. coli* contamination of the crabmeat (see Table II).

In some plants the crabmeat, after its removal from the crab, is placed in a collander and dipped in an iced brine. Where this practice is followed there is very great danger that the brine may become polluted and will actually add thousands of bacteria to the meat. The brine, if used at all, should be changed frequently, and should be well iced at all times. Our examination of dipping brines had shown that in some cases the large number of bacteria in the meat, and the presence of the unwanted *E. coli*, could be attributed very largely to the

**Table I—Incidence of Escherichia-Aerobacter Group in Fresh Crabmeat.**

| Sample number | Total count | Escherichia-aerobacter | Intermediate group | E. coli M.P.N./10 gm. |
|---|---|---|---|---|
| 1 | 61,000 | + | − | 8.8 |
| 2 | 340,000 | + | + | 240.0 |
| 3 | 1,970,000 | + | + | 0 |
| 4 | 870,000 | + | − | 240.0 |
| 5 | 620,000 | + | − | 3.9 |
| 6 | 1,210,000 | + | + | 5.1 |
| 7 | 1,000,000 | + | − | 0 |
| 8 | 750,000 | + | + | 5.0 |
| 9 | 99,000 | − | − | 0 |
| 10 | 175,000 | + | + | 8.8 |
| 11 | 420,000 | + | + | 21.0 |
| 12 | 311,000 | − | − | 0 |
| 13 | 470,000 | + | + | 8.8 |
| 14 | 1,220,000 | + | + | 240.0 |
| 15 | 660,000 | + | − | 20.0 |
| 16 | 540,000 | − | − | 0 |
| 17 | 2,010,000 | + | − | 5.1 |
| 18 | 910,000 | + | + | 240.0 |
| 19 | 450,000 | + | + | 12.0 |
| 20 | 340,000 | + | + | 39.0 |

**Table II—Sources of Escherichia-Aerobacter Group in the Packing Plant.**

| Sample | Number samples examined | Coliform group No. + | Coliform group % + | E. coli No. + | E. coli % + |
|---|---|---|---|---|---|
| Hands | 139 | 82 | 58.9 | 16 | 11.5 |
| Utensils | 31 | 30 | 96.8 | 18 | 58.1 |
| Cans | 15 | 0 | 0 | 0 | 0 |
| Brine | 25 | 24* | 96.0 | 22 | 88 |
| Ice | 50 | 50* | 100 | 50 | 100 |

*Five 10-c.c., one 1-c.c., and one 0.1-c.c., portions of brine or melted ice were examined.

use of brines which had been in use too long and were heavily polluted with bacteria. Some brine samples were found to contain as many as 2,000,000 bacteria per cubic centimeter. Obviously, immersing crabmeat in a brine containing 2,000,000 organisms per cubic centimeter will greatly impair its sanitary quality.

Before the meat is packed in cans it must be carefully searched for fragments of bone. These fragments are very thin, about the same color as the body meat, and consequently the meat must be gone over in detail with the hands in order to detect them. Again, the hands of the workers may contribute numbers of objectionable bacteria to the meat unless great care is exercised to see that the workers' hands are washed thoroughly immediately preceding the sorting operation. The packing of the crabmeat into cans is done by hand and is subject to the same risk of bacterial contamination as described above. As a precautionary measure the cans should be rinsed with a chlorinated solution containing 50 to 60 p.p.m. of chlorine.

### *Contamination by Ice*

Another source of bacterial contamination of the crabmeat, and one which may be unsuspected, is the ice used for cooling the brine (if used) and for packing the meat. Although the ice employed is commonly made from pure water, and contains no objectionable bacteria, it is sometimes handled in the plant in such a way that it becomes heavily contaminated (see Table II).

Such ice does not appear dirty to the eye, and consequently is not suspected of being a source of bacteria in the meat. Contaminated ice may be a most important source of *E. coli*, for the contamination is usually derived from floors which are polluted with soil from the shoes of workmen. In still another way the use of contaminated ice may cause pollution of the crabmeat. Since the cans (Snaplock type) in which crabmeat is usually packed are not watertight, it is easily possible for the water from melting ice to enter them, carrying bacterial contamination, and thus cause loss of quality in the product. By sterilizing cans of crabmeat in a steam retort, and then cooling them with crushed ice contaminated with *E. coli*, it was found that the cans of meat became contaminated with that organism (see Table III). This is an observation of great importance, for it means that all the care used in picking and packing the meat may be nullified by a little carelessness in the handling of the ice used in keeping the meat cold during storage or shipment.

**Table III—The Contamination of Packaged Crabmeat from Melting Ice.**

| Sample number | Cans *with* holes, total count | M.P.N./ 10 gm. E. coli | Cans *without* holes, total count | M.P.N./ 10 gm. E. coli |
|---|---|---|---|---|
| 1..... | 3,300 | 5.0 | 2,060 | 0 |
| 2..... | 1,040 | 0 | 970 | 0 |
| 3..... | 3,000 | 0 | 1,750 | 0 |
| 4..... | 1,990 | 240.0 | 1,870 | 0 |
| 5..... | 1,350 | 5.0 | 450 | 0 |
| 6..... | 4,560 | 15.0 | 820 | 0 |
| 7..... | 3,980 | 8.9 | 1,990 | 0 |
| 8..... | 5,900 | 2.2 | 990 | 0 |
| 9..... | 3,100 | 7.6 | 2,460 | 0 |
| 10..... | 6,640 | 39.0 | 890 | 2.2 |
| 11..... | 2,440 | 0 | 730 | 0 |
| 12..... | 1,550 | 0 | 420 | 0 |
| 13..... | 7,200 | 21.0 | 1,150 | 0 |
| 14..... | 1,220 | 0 | 289 | 0 |
| 15..... | 9,400 | 15.0 | 950 | 0 |
| 16..... | 11,300 | 0 | 1,770 | 0 |
| 17..... | 5,200 | 5.0 | 350 | 0 |
| 18..... | 1,740 | 0 | 880 | 0 |
| 19..... | 3,560 | 4.4 | 3,490 | 2.2 |
| 20..... | 2,880 | 0 | 1,740 | 0 |

### *Other Sources of Bacteria*

But what of the utensils—cans, collanders, table tops, and so forth—as a source of bacterial contamination? These are also important as possible sources of pollution, but they do not seem to have been neglected as much as the sources mentioned above. Every effort must be made to cleanse these articles thoroughly before they are used in order to avoid trouble from these sources. A chlorinated solution of the strength mentioned above is recommended for cleansing these utensils.

The water used in the plant for washing the crabs, the salt for the brine, where it is used, and the cans to receive the meat all require careful examination and unrelenting vigilance in order to avoid the addition of undesirable bacteria to the product.

Finally, what steps in the crabmeat packing plant require most careful watching if bacterial contamination is to be avoided? The answer is every step from the squirming crab to the waiting customer. A perfectly sanitary product results when every step in the process is correctly done; the product is made unsanitary by a single step slightly neglected. If anything is to be singled out to receive double vigilance, let us say, watch the hands of the workers, the dipping brine (if used) and the ice.

# Flash Sterilization Kills Spoilage Spores

By D. J. WESSEL and H. A. BENJAMIN*
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**Continuous, short-time, high-temperature process kills heat-resistant spores in juice in experimental tests. Method shows commercial promise.**

DURING the past few years tomato juice canners have reported a number of instances of spoilage in tomato juice, and in products made from tomato juice, by microorganisms possessing considerable resistance to destruction by heat. These heat-resistant organisms are spore formers and are capable of surviving the commercial boiling-water (212 deg. F.) processes now being employed by the industry for tomato juice. One of the most troublesome types is a flat sour organism producing off-flavors in the juice without appreciable effect on the can vacuum. Strict sanitary control of sources of contamination in manufacturing equipment, as reported by Pearce[1] and by Williams,[2] has been recommended to guard against infection by these resistant types, but despite strictest precautions, experience has shown that some spoilage may still be encountered through inadvertent contamination. Consequently, this laboratory has investigated means of controlling such spoilage through heat treatments of increased lethality.

As one step in this investigation, processing studies were carried out to determine what effect strictly non-agitating processes using temperatures higher than 212 deg. F., and sufficiently long to destroy these resistant

* Based on a paper presented before the Canning Problems Conference of National Canners Association, at Chicago, Jan. 21, 1941.

spore formers, would have on the quality of tomato juice. Heat penetration tests were conducted on three different can sizes of tomato juice, using various retort temperatures above 212 deg. F. From the heating data obtained, processes were calculated sufficient to destroy, in the particular juice tested, the most resistant flat sour spoilage organisms that have been studied. The calculated processing times are given in Table I.

Using the preceding processes, exp rimental samples were packed to study the quality resulting. As expected from the markedly increased severity of the heat treatment over the range commonly employed commercially, examination of the samples definitely indicated that these processes could not be employed because of the deleterious effect on flavor and general quality of the tomato juice.

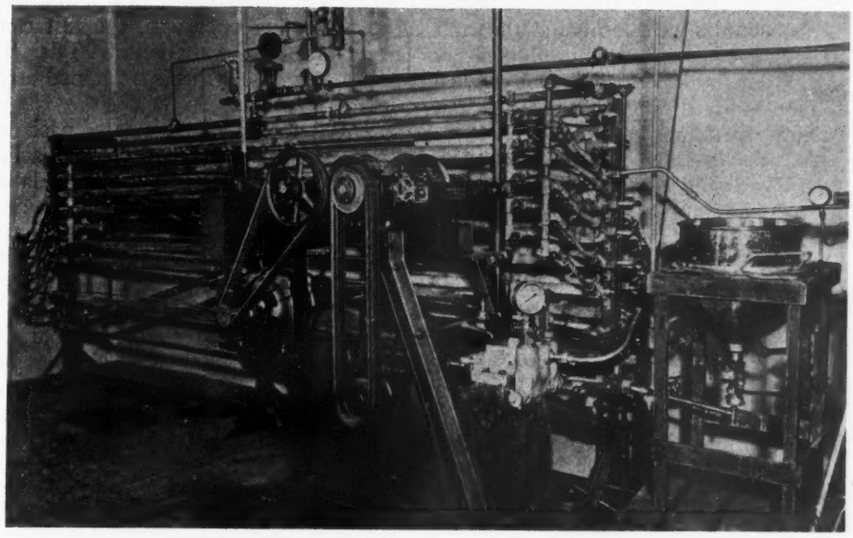
Agitated processing of cans of tomato juice was studied in a limited way. Controlled agitation in which each can is made to rotate rapidly on its cylindrical axis, either continuously or intermittently, in a heating bath of water or while passing under hot water sprays has increased the rate of heating considerably in tomato juice (Stevens[8]). With this rapid heating and using temperatures above 212 deg. F. with processing times sufficient to destroy heat-resistant spoilage organisms, it may be possible to obtain good-quality tomato juice processed in the can without danger of spoilage from such organisms.

### *"Flash" Process Studied*

This laboratory also carried on an investigation of processing tomato juice by the so-called "flash" process in which the product is exposed to elevated temperatures for a short period of time in a tubular heat exchanger. The ideal "flash" process would be to heat the product very rapidly to a sufficient temperature, hold for a sufficient time to destroy these resistant types, cool rapidly to about 70 deg. F., fill into sterilized cans and seal on sterilized covers in an aseptic filling and closing machine.

However, since aseptic filling and closing machines are not available commercially, this investigation was carried out with the thought that conventional filling and closing machines could be used. Following the "flash" process the product would be cooled to about 190 deg. F., filled, closed and the cans then subjected to a short boiling-water process to destroy non-resistant microorganisms with which tomato juice might be contaminated after the "flash" process.

In theory, this method of processing presumes that the juice would not be recontaminated with resistant organisms during filling and closing. Since these resistant spoilage organisms are of soil-borne types and commonly enter the plant with the raw product, it seems likely that this assumption is a reasonable one.



**Experimental heat exchanger, including both the heating and the cooling tubes, used in the investigation of "flash" processing of tomato juice. The product flows from the stainless steel kettle through the three-cylinder homogenizer pump (homogenizing valve removed) and through the heat exchanger.**

### *The Purpose*

Primarily, the purpose of this study was to determine what effect a short high-temperature process sufficient to destroy resistant spore formers would have on the flavor and general quality of tomato juice. However, before experimental quality packs could be made it was necessary to conduct heating tests to determine the required conditions for processing, such as time, temperature and rate of flow through the experimental heat exchanger, and to test the efficiency of this method of processing by means of an inoculated pack.

Since the flat sour type is apparently the predominating spore former causing spoilage in tomato juice, and since it is also the most heat resistant, processing conditions were determined for the destruction of this type. In the investigation to determine the optimum processing conditions by means of an inoculated pack, the facultative thermophilic organism, *Bacillus thermoacidurans*, was used. This organism was first isolated from tomato juice spoilage by Berry[4] and is one of the most resistant of the flat sour strains causing spoilage in tomato juice and tomato juice products.

### *"Flash" Equipment*

In the experimental tubular heat exchanger used in this investigation, six ⅜-in. nominal size, stainless-steel, polished pipes were used for heating and one ½-in. nominal size, stainless-steel pipe for cooling. These pipes were connected in series with U bends. Each heating section was 15 ft. long and was jacketed with a 1½-in. standard pipe having a steam inlet and condensate drain. The cooling section was of similar construction except that the jacket was equipped with a water inlet and outlet. The outlet of the cooling section was connected to a spring relief valve through which the product discharged from the system for filling into cans. This relief valve was set at about 40 lb., pressure and maintained a pressure in the system sufficiently high to prevent boiling in the heating tubes. By means

**Table I—Processes Sufficient to Destroy Resistant Flat Sour Organisms.**

| Can size | Initial temperature | Processing time at 220° F. | 230° F. | 240° F. |
|---|---|---|---|---|
| 303 x 509 | 170° F. | 95 | 65 | 50 |
| 404 x 700 | 180° F. | 120 | 85 | 70 |
| 603 x 700 | 180° F. | 160 | 120 | 100 |

**Table II—Calculated Equivalent Flow Rates for Commercial Tubing.**

| Tubing of outside diameter | Inside diameter, in. | Linear velocity, ft. per sec. | Minimum rate of flow, gal. per min.* |
|---|---|---|---|
| ⅝ | 0.527 | 0.95 | 0.65 |
| ¾ | 0.652 | 0.77 | 0.8 |
| 1 | 0.902 | 0.50 | 1.0 |
| 1½ | 1.402 | 0.41 | 2.0 |

*Higher rates of flow would always result in greater turbulence and would be desirable.

of special fittings, copper-constantan thermocouples were located at the ends of the various sections, and temperature measurements were made of the flowing tomato juice during the heating and cooling operations.

A three-cylinder homogenizer type pump with the homogenizing valve removed was employed to force the product through the pipe system at a uniform flow rate of 0.6 gal. per minute. With this flow the total heating time was calculated to be 96 seconds and the linear volocity, 1 ft. per second.

With the foregoing flow through the ⅜-in. stainless-steel pipe system, tomato juice heats rapidly, indicating the conditions of flow to be turbulent, which is desirable from heat-transfer and pressure-drop considerations. From the pipe size and rate of flow used in these experiments, rates of flow in gallons per minute were calculated for various sizes of commercial inside-polished tubing which would give equivalent degrees of turbulence. These estimated values are given in Table II.

### *Inoculated Pack*

In order to test the efficiency of the tubular heating system as a sterilizing unit, an inoculated pack was made using the resistant spore former *Bacillus thermoacidurans* as a test organism. The spore concentration of this organism in the fresh tomato juice prior to processing was approximately 20,000 spores per milliliter.

Employing the tubular heat exchanger, a rate of flow of 0.6 gal. per minute and a temperature range sufficient to result in both survival and destruction of the organism, four lots were packed at different jacket temperatures. These lots were canned using an aspetic filling and closing machine to insure against contamination following the processing procedure. Six control lots were packed by the ordinary process in 211x400 size cans to establish the resistance of the inoculum. These controls were given boiling-water (212 deg. F.) processes of graduated severity to bracket both survival and destruction. Following the processing operation, the test cans were placed in incubation at 98 deg. F. and duplicate cans were examined after 7 and 14 days' storage.

The results of the inoculated pack are given in Table III, together with jacket temperatures, processes and calculated thermal equivalents at 250 deg. F. and at 212 deg. F. with instantaneous heating. In each "flash" processed lot the juice reached jacket temperature and the total heating time was 96 seconds.

It will be noted that complete destruction of the organisms was not accomplished in the controls, even for the control lot processed 160 minutes at 212 deg. F. However, on the basis of spore-count determinations, nearly complete destruction was obtained in the 160-minute processed lot, indicating that the thermal resistance was probably greater than the calculated 116 minutes at 212 deg. F. In the short high-temperature processed lots, complete spore destruction was accomplished using a jacket temperature of 252 deg. F., and nearly complete destruction with a jacket temperature of 247 deg. F. Based on temperature measurements made during the pack, the process with a jacket temperature of 252 deg. F. was evaluated to be equivalent to holding the juice itself for 142 minutes at 212 deg. F. and the process with a jacket temperature of 247 deg. F., equivalent to holding the juice for 94 minutes at 212 deg. F. On the basis of spore-count determination, the calculated thermal equivalents for the "flash" processed lots check with those for the control lots quite closely.

### *Quality Pack*

To determine what effect a short high-temperature process adequate for the destruction of *Bacillus thermoacidurans* would have on the quality of tomato juice, experimental samples were packed using the tubular heat exchanger. The "flash" heating was followed by non-aseptic filling and closing and a short, conventional, boiling-water process. In this pack a jacket temperature of 252 deg. F., corresponding to a thermal equivalent of 142 minutes at 212 deg. F., was used. Following the "flash" process the juice was filled into 211x400 size cans at a temperature of about 190 deg. F., closed and processed 15 minutes in boiling water (212 deg. F.). For quality comparison, two control lots were packed in the conventional manner. One lot was processed 15 minutes at 212 deg. F. and the second was given a process of 27 minutes at 212 deg. F.

The experimental samples were examined by a number of observers for flavor and color. In general, the opinion was that the "flash" processed and control samples were comparable in flavor and general quality and that no commercially significant differences were exhibited.

Of course, only one set of processing conditions, such as jacket temperature, rate of flow and linear velocity, was tested in packing these experimental samples. However, if different processing conditions had been used to give turbulent flow and the same effective heat, it is believed, from experience gained in experimenting with this method of processing, that similar lack of any detrimental effect on the quality of the tomato juice would have resulted.

### *Summary*

For several years, plant sanitation measures designed to keep the number of organisms entering the product to a harmless minimum have been employed to control flat sour spoilage, and other spoilage caused by heat resistant bacteria, in tomato juice and products containing tomato juice, without complete success. Means of more positive control through heat treatments adequate to destroy such organisms have been discussed.

With respect to processing in the can, increasing the severity of still cooks for tomato juice, using longer times and higher temperatures than at present employed, appears impracticable because of the deleterious effect on the quality of the product. A limited study of agitating processes indicates that high-speed rotation, by increasing rate of heat penetration, holds considerable promise of permitting use of more lethal processes without serious impairment of the quality of the product.

Although only studied on an experimental basis, the results obtained indicate that "flash" processing tomato juice in a tubular heat exchanger for a time and temperature equivalent to the thermal death time of the contaminating organism, rapidly cooling to 190 deg F. before filling, and processing of the closed cans for a brief time at 212 deg. F. to destroy nonresistant types entering

**Table III—Inoculated Pack Data.**

| Lot | Process | Jacket temp. of process | Calculated thermal equivalents, min. at* 250° F. | Calculated thermal equivalents, min. at* 212° F. | Bacterial count per milliliter** 7 days | Bacterial count per milliliter** 14 days |
|---|---|---|---|---|---|---|
| 1..... | Flash | 258° F. | 2.10 | 271 | 0–0 | 0–0 |
| 2..... | Flash | 252° F. | 1.10 | 142 | 0–0 | 0–0 |
| 3..... | Flash | 247° F. | 0.73 | 94 | 0–0 | 1–1 |
| 4..... | Flash | 239° F. | 0.23 | 30 | 1900–2200 | 1600–1800 |
| 5..... | Conventional | 160 at 212° F. | 0.90 | 116 | 2–3 | 0–0 |
| 6..... | Conventional | 140 at 212° F. | 0.75 | 97 | 5–6 | 1–1 |
| 7..... | Conventional | 120 at 212° F. | 0.60 | 78 | 12–13 | 15–26 |
| 8..... | Conventional | 100 at 212° F. | 0.45 | 58 | 200–400 | 1000–1000 |
| 9..... | Conventional | 80 at 212° F. | 0.30 | 39 | 4200–4600 | 1600–2500 |
| 10..... | Conventional | 60 at 212° F. | 0.16 | 21 | 7000–9600 | 11,000–14,000 |

*The customary thermal death time curve slope of 18 deg. F. was assumed in these calculations.

**The results of the count on each can are shown.

Note: 211 x 400 cans were used for the conventional processed lots, and 303 x 306 cans for the "flash" processed lots.

during filling, could be employed commercially with success. No loss in quality over that packed by conventional methods was found in juice canned by this procedure. Of course, the success of this "flash" sterilization in preventing all types of spoilage would be dependent upon the avoidance of resistant contamination in the filling equipment, cans and covers. However, since the resistant spoilage organisms are of soil origin, it seems highly unlikely that with ordinary sanitary precautions recontamination would occur during the filling and closing operations.

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# Brief Summaries Of AMS Standards For Canned Foods

**For the convenience of those who control quality in the food industries, the following digests have been prepared of the standards issued by the Agricultural Marketing Service.**

ABSTRACTS containing the principal requirements of the standards issued by the Agricultural Marketing Service of the U. S. Department of Agriculture are prepared by FOOD INDUSTRIES. Those that follow, and others to come in later issues, continue the series started last year.

The complete text of the standards can be obtained from the AMS, located in Washington, D. C.

## Tomato Catsup

(Final)

The standard of identity for tomato catsup promulgated under Sec. 401 of the Federal Food, Drug and Cosmetic Act of June 25, 1938, is hereby adopted for the purpose of these grades. Mold filament may show in not to exceed 40 percent of the microscopic fields, when examined according to the Howard method.

U. S. GRADE A or U. S. FANCY tomato catsup possesses a good red, ripe tomato color and a good consistency; has a uniform smooth finish; is practically free from particles of seed, skin, core and other defects; possesses a good flavor; has a specific gravity of not less than 1.15; and scores not less than 85 points when scored according to the scoring system outlined herein.

U. S. GRADE C or U. S. STANDARD tomato catsup possesses a fairly good red color and a fairly good consistency; has a fairly good finish; is fairly free from particles of seed, skin, core and other defects; possesses a fairly good flavor; has a specific gravity of not less than 1.11; and scores not less than 70 points.

OFF-GRADE tomato catsup is tomato catsup which fails to meet the requirements for U. S. GRADE C or U. S. STANDARD but is sound and clean and does not exceed the tolerance for mold.

If packed in bottles, the containers shall be so filled that the product occupies 90 percent or more of the volume capacity of the container, measured in fluid ounces. If packed in cans, the head space shall not exceed the maximum allowable, as indicated in a table in the standards. If the head space or fill requirements are not met, or if the containers have not been filled as full as practicable without impairment of quality, certificates of grade shall bear the statement, "Below Standard in Fill."

The grade of tomato catsup may be ascertained by considering, in addition to the foregoing requirements, the following factors (25 points each): Color, consistency, absence of defects and flavor. The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

The score for the factor color is determined by comparing the color of the product with that produced by spinning a combination of the following Munsell color disks: Disk 1—red (5R 2.6/13)—(Glossy finish); disk 2—yellow (2.5YR 5/12)—(Glossy finish); disk 3—black (N1)—Glossy finish); and disk 4—grey (N4)—(Mat finish).

Grade A tomato catsup is of good red, ripe tomato color. This color is the equivalent of or better than that produced by spinning the above mentioned Munsell color disks in the following combination: 65 percent of the area Disk 1; 21 percent of the area Disk 2; 14 percent of the area either Disk 3 or Disk 4 or any combination of the two. Grade A tomato catsup, when packed in glass, must not show discoloration in the "neck" of the bottle.

The color of Grade C catsup is the equivalent of or better than that produced by spinning the above-mentioned Munsell color disks in the following combination: 53 percent of the area Disk 1; 28 percent of the area Disk 2; 19 percent of the area either Disk 3 or Disk 4 or any combination of the two.

If the color is poor or fails to meet the requirements of Grade C catsup, or if the catsup in the "neck" of the bottle is badly discolored, it shall not be graded above OFF-GRADE.

The factor of consistency refers to the homogeneity of the product. Separation of free liquid is to be noted in this connection.

The factor absence of defects refers to specks, particles of seed, skin, or core, or other defects indicating improper preparation of the tomato material.

The factor of flavor of tomato catsup shall be classified from the standpoint of palatability.

ISSUED: March 24, 1941.
EFFECTIVE: April 15, 1941.

## Canned Apricots

(Tentative)

The standards of identity, fill of container and quality for canned apricots and amendments thereto promulgated under Sec. 401 of the Federal Food, Drug and Cosmetic Act of June 15, 1938, are hereby adopted for the purpose of these grades.

Canned apricots may be halved (peeled or unpeeled, pitted, cut ap-

proximately in half along the suture from stem to apex) or whole (peeled or unpeeled, unpitted, but the fruit may be slit along or through the suture).

U. S. GRADE A or U. S. FANCY canned apricots are apricots of similar varietal characteristics; are of typical, practically uniform color; are practically uniform in size and symmetry; are practically free from defects; possess a tender fleshy texture; possess a normal apricot flavor; and score not less than 90 points when scored according to the scoring system which is outlined in the standard.

U. S. GRADE B or U. S. CHOICE canned apricots are apricots of similar varietal characteristics; are of typical, reasonably uniform color; are reasonably uniform in size and symmetry; are reasonably free from defects; possess a reasonably tender texture; possess a normal apricot flavor; and score not less than 75 points.

U. S. GRADE C or U. S. STANDARD canned apricots are apricots of similar varietal characteristics; are fairly uniform in color, size and symmetry; are fairly free from defects; may possess a variable texture but none of the pieces are objectionably hard, or mushy; possess a normal apricot flavor; and score not less than 60 points.

U. S. GRADE D (Seconds) canned apricots may be noticeably variable in color, but are not off-color; may be noticeably variable in size and symmetry; may possess prominent mechanical defects, but if halved, contain not more than one apricot pit to each 50 oz. of net contents, unless declared on the label that pits have been added as flavoring material, and are fairly free from pathological defects; may possess a noticeably variable texture, but are not mushy, or so hard as to be inedible; and possess a normal apricot flavor. Apricots of this grade are usually packed in light sirup.

U S. GRADE E (Water) canned apricots are of the same character as U. S. GRADE D (Seconds) except packed in water.

U. S. GRADE F (Solid Pack-Pie) canned apricots are of the same character as U. S. GRADE D (Seconds) except packed without added water or sirup in such manner that the drained weight is 92 oz. or more for No. 10 cans.

OFF-GRADE canned apricots are apricots which fail to meet the requirements of the foregoing grades.

Canned apricots that fall below the Standard of Quality promulgated under the Federal Food, Drug and Cosmetic Act will be certified with the additional statement, "Below Standard in Quality", together with the reason for so certifying.

Grades A, B, C and D of canned apricots are usually packed in sugar sirup. Sirup "cut-out" requirements, however, are not incorporated in grades of the finished product as sirup, as such is not a factor of grade.

Canned apricots will be certified as to grade without regard to sirup density, but in each instance official certificates of grade will bear a notation in connection with the grade statement indicating the density of sirup found upon examination. For this purpose, "extra heavy sirup" means that the sirup tests 25 deg. Brix or over. "Heavy sirup" means that the sirup tests 21 to 25 deg. Brix. "Medium sirup" means that the sirup tests 16 to 21 deg. Brix. "Light sirup" means that the sirup tests 12 to 16 deg. Brix. "Water pack" means that the packing medium tests less than 12 deg. Brix.

As used in these grades, "normal flavor" means that the product is free from objectionable or off flavors.

The minimum drained weights and the maximum head space recommended for the cans commonly used in packing canned apricots are shown in a table in the standards. The maximum number of halved or whole apricots per can, and the maximum variation in the number of pieces per can shall correspond to the count indicated in another table in the standards. Official certificates of grade will indicate the range of count in the cans graded.

The grade of canned apricots may be ascertained by considering, in addition to the foregoing requirements, the following factors: color (25 points), uniformity of size and symmetry (15 points), absence of defects (25 points) and character of fruit (35 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

To receive the highest color rating apricots must be typical of the variety and practically uniform, and if unpeeled not more than 10 percent of the surface area of the peel of each unit may be lighter than Plate 9, L-8.*

If the color of the apricots is typical of the variety and reasonably uniform, and if unpeeled not more than 10 percent of the surface area of the peel of each unit is lighter in color than Plate 9, L-7,* a score of 18 to 21 points may be given.

The color of Grade C apricots is typical of the variety, but only fairly uniform and is not lighter than Plate 10, L-5.* Apricots that fall into this classification shall not be graded above U. S. GRADE C or U. S. STANDARD, regardless of the total score.

If the color of the apricots fails to meet the requirements of the foregoing grades they shall not be graded above U. S. GRADE D (Seconds), regardless of the total score for the product.

The factor of ABSENCE OF DEFECTS has reference to the character of the workmanship in the preparation of the product, also the presence of bruised spots, particles of pit, "freckles," knife marks, discolorations of any kind, mechanical, physiological or pathological damage of any kind, or insect injury.

Under the factor of CHARACTER OF FRUIT, consideration is given to the degree of ripeness, the texture of the fruit and its tendency to retain its original conformation and size without material disintegration.

A sample score sheet is included as part of this standard.

ISSUED: Jan. 3, 1941.
EFFECTIVE: Feb. 1, 1941.

## Canned Kadota Figs

(Tentative)

Canned Kadota figs are prepared from the properly ripened fresh fruit of the Kadota fig tree. The fruit may be packed with or without sugar sirup, and is sufficiently processed by heat to assure preservation of the product in hermetically sealed containers.

U. S. GRADE A or U. S. FANCY canned Kadota figs are of typical, practically uniform color; are practically uniform in size and symmetry; are practically free from defects, with not more than 20 percent by count of split figs; possess a tender, fleshy texture; possess a normal flavor; and score not less than 85 points when scored according to the scoring system outlined in the standard.

U. S. GRADE A SPLIT or U. S. FANCY SPLIT canned Kadota figs are figs which meet the requirements for U. S. GRADE A or U. S. FANCY except that more than 20 percent by count of the figs are split.

U. S. GRADE B or U. S. CHOICE canned Kadota figs are of typical, reasonably uniform color; are fairly uniform in size and symmetry; are fairly free from defects, with not more than 20 percent by count of split figs; possess a fairly tender, fleshy texture; possess a normal flavor; and score not less than 70 points.

(Turn to page 74)

* *Note*—The colors mentioned are according to illustrations in "Maerz and Paul's Dictionary of Color."

# Pectin Decomposition Vs. Sugar Inversion In Jelly

By G. L. BAKER and W. M. GOODWIN*
Delaware Agricultural Experiment Station, Newark, Del.

**In the debate as to what makes the physical quality in a jelly, the argument is primarily over the value of a short and controlled period of both evaporation and hydrolysis. This article introduces new evidence to show that the hydrolysis of the pectin itself, rather than hydrolysis of the sucrose, is the important matter.**

QUALITY of cranberry sauce, like that of any other jellied product, is primarily dependent upon raw materials and the preservation of pectic values during manufacture. Unless the jellied product has uniformity of strength and is free from excessive syneresis, the quality is considered as impaired. Conditions which will affect these two factors of quality have been considered and their effects summarized at this time.

In the production of cranberry sauce, the berries are extracted by boiling or heating with water for a given number of minutes. Pectic values, as well as desirable colors and flavors, are developed during the heating period. This heating or "popping" time can be varied somewhat, depending upon factory conditions, without injury to the quality of the final product. Concentration of the extract or pulp and the pectic value can be varied over a wide range and still produce jellies, provided 35 to 40 percent of added sugars are present. This figure for added sugar corresponds to 40 to 45 percent of total soluble solids when solids due to cranberries are included. Ripeness of berry and varietal factors will affect the optimum percentage of sugar slightly.

Through the kindness of Dr. Nealy of Cranberry Canners, Inc., two varieties of cranberries, the Early Black and the Howe, were obtained for these experiments. The cranberry extract for these tests was prepared as follows: 500 grams of berries and 550 grams of water were brought to a rapid boil and boiled six minutes. The weight was readjusted to 1,050 grams and the fruit put through a conical colander as a pulper. In order to obtain uniform jelly strength results, it was found necessary to filter off the pulp through cheese cloth. The resulting filtrates, free from pulp, had relative viscosities (Ostwald 80 deg. F.) between 40 and 50.

Strength of cranberry jellies depends upon the relative viscosity developed during the extraction and pulping. Relative viscosity of cranberry extractions has been correlated with strength of jelly by Baker and Kneeland.[2] The strength of the product may be regulated at will.

Since the hydrogen-ion concentration will be found to approximate that represented by pH 2.4 to 2.5 for most cranberry varieties, this jellying factor will not appreciably influence jelly values.

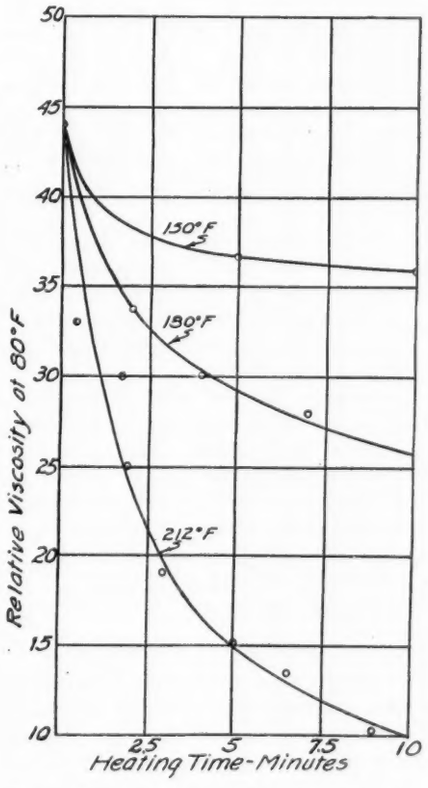



Fig. 1. Effect of heat on the viscosity of a cranberry juice extract

### *Hydrolysis of Sugar Or of Pectin?*

A most essential point—one which seems to be the center of some differ-

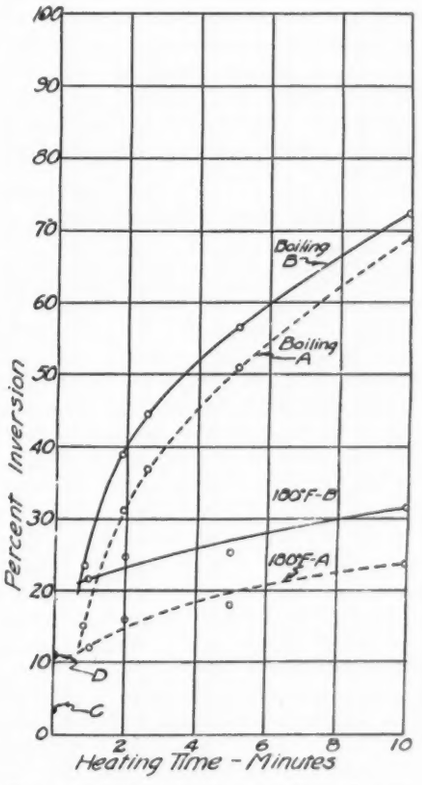



Fig. 2. Effect of heat processing of cranberry sauce on the inversion of added cane sugar. The solid line shows the effect of six-day aging at room temperature for the corresponding product shown by the adjacent dotted line.

*Published with the approval of George L. Schuster, Director, Delaware Agricultural Experiment Station.

ence of opinion at the present time—is the effect of inversion (hydrolysis) of added sugar upon the strength of the resulting jelly and upon syneresis. Conditions introduced in order to study the effect of the inversion of sugar upon the quality of the product were also expected to affect the quality of the pectin. Any study, therefore, has to distinguish between the two possible results.

### *Effect of Long Boiling with Sugar*

It was found that increased boiling time decreased the jelly strength of jellies made from both the Early Blacks and the Howes in a similar manner. For instance, two minutes of boiling produced jellies with a strength of 57 and 52 (centimeters of water pressure)[1], while seven minutes of boiling reduced the strength to 26 and 17, respectively. When the strengths of a series of jellies were plotted against increased time of boiling, a curve with a nearly vertical slope was produced. From this it may be understood that the strengths of cranberry jellies decrease very rapidly when the evaporation time is increased. Not only was the strength of jelly decreased in these experiments but also the amount of syneresis liquor was increased by from two to four times that obtained from jellies made by the original two-minute boil. Sugar, which at higher concentrations (as in 65 percent sugar jellies) would act as a protective agent for pectin, does not appear to protect the jellying values of the cranberry pectin at boiling temperatures.

### *Boiling Juice Without Sugar*

When the juice was boiled for varying periods previous to adding sugar, the water lost by evaporation being replaced at intervals, jelly strengths and syneresis values followed the same pattern as with increased boiling time; that is, lowered strengths and increased syneresis resulted. Throughout the study it was found that as strengths increase, syneresis values decrease. In this case, the amount of invert sugar in the finished product would be constant. Considering the similar strength results obtained in these two experiments, one where the normal amount of invert sugar is increased by longer boiling, and the other where the amount of invert sugar is approximately constant, it will be understood that the inversion of sugar does not influence jelly strength. It is more likely that the decomposition of pectin is the more important factor in the loss of strength and increased syneresis.

Since viscosity of juices and strength of jellies may be correlated, it is reasonable to expect that, if juices are given the same heat treatment as applied when making jellies, viscosities might decrease in a manner similar to the decrease found for jelly strengths. Upon experimentation, this expectation was fulfilled; the viscosity of the cranberry juice decreased rapidly upon boiling. Figure 1 shows the effect of heating strained cranberry juices at 212 deg. F., 180 deg. F. and 150 deg. F. It will be seen from the figure that at temperatures below 150 deg. F. the decline in viscosity (after the initial effects of heat application) will be very low. Hydrolysis (decomposition) of cranberry pectin is rapid at high temperatures and must be responsible for the decrease in jelly strengths found in jellies produced by long boiling. Therein lies that apparent value in the cooling of the canned product as generally practiced by the trade.

### *Inversion of Sugar*

The inversion of sugar during cranberry jelly manufacture was expected to be extensive on account of the prevailing low pH. Figure 2 (curve marked "Boiling-A") shows results which are contrary to this expectation. Upon boiling juice with sugar, it was found that about 30 percent of the added sugar was inverted in two minutes and about 70 percent in ten minutes. Samples were taken 30 minutes after completing the jelly cook. The other curve ("Boiling-B") shows the amount of invert sugar in the same jellies after six days storage at 72 deg. F. While pectin is known to retard the inversion of cane (sucrose) sugar,[3] the amount present (0.16 percent) and the boiling temperature nullify the possibility of any extensive influence while making these jellies.

As a further proof that inversion of sugar is not a factor in cranberry jelly manufacture, a cold jelly was made up by mixing 39 parts sugar with 61 parts of the viscous pectin extract. In Fig. 2, the letters *C* and *D* indicate the invert material after 24 hours and after six days, respectively, of storage at room temperature. The strength of this jelly after the six-day period was 86 compared to 60 for the one-minute boiling jelly, where 24 percent of the sugar had inverted, and to 24 for the ten-minute boiling jelly, with 72.5 percent of invert sugar.

### *Control of Inversion*

Reich[4], in a discussion of continuous jelly making, gives a list of five factors which must be carefully controlled during the cooking process. The first three, rate of evaporation, temperature of evaporation, and time of evaporation, are without doubt important in cranberry jelly manufacture on account of their effect upon pectin as the preceding paragraphs have shown. The control of the other two factors, rate of inversion and the time of inversion, while important in the manufacture of 65 percent soluble solids jelly, is of questionable importance in cranberry sauce manufacture. In addition to the fact that inversion will continue even during storage at the prevailing low pH, cranberry sauces have a soluble solids content well below the point where crystallization of sugars would occur at normal storage temperatures. In the 65 percent soluble solids jelly, a certain amount of inversion is necessary to prevent sugar crystallization. This inversion has no influence on the strength of the 65 percent jelly.[5,6] While the experiments at boiling temperature have already proved this point, it was thought that further proof could be found at a lower inversion temperature. Two different methods were employed.

### *The Two Methods*

First, evaporation at 212-216 deg. F. was carried out and then inversion was allowed to proceed at 180-190 deg. F. (See Fig. 3 of Reich's article.[4]) The strength of the resulting jellies fell off at just about the same rate as the viscosity of a cranberry extract would decrease. (See curve at 180 deg. F., Fig. 1.)

By actual experiment, inversion of cane sugar in cranberry sauce is very slow at 180 deg. F., as may be seen from curve "180 deg. F.-A," in Fig. 2. Solid line shows effect of six days aging at room temperature upon inversion.

Secondly, sugar and pulp were held at 180-190 deg. F. for varying lengths of time previous to evaporation at boiling temperatures. (See Fig. 7 of Reich's article.[4]) It was found that when the sugar and pulp were held for periods up to ten minutes before evaporation, very little decrease in strength occurred with increase in the time period.

Since in the first case, where theoretically evaporation preceded inversion,

(*Turn to page 91*)

#### References

[1]G. L. Baker, *Fruit Products Journal* Vol. 17, 329, 1938.

[2]G. L. Baker and R. F. Kneeland, *Industrial and Engineering Chemistry* Vol. 28, 372, 1936.

[3]S. Berlingozzi and M. Testoni, *Ann. Chim. Applicata* Vol. 25, 489, 1935.

[4]G. T. Reich, *Food Industries* Vol. 11, 190, 1939.

[5]L. W. Tarr, Delaware Agricultural Experiment Station *Bulletin* No. 143, Tech. No. 5, 1926.

[6]L. W. Tarr and G. L. Baker, Delaware Agricultural Experiment Station *Bulletin* No. 136, Tech. No. 3, 1924.

# Automatic Control Improves Vinegar Manufacture

By JOE LOWY, New York, N. Y.

**Doubled yield, flexible output, economy of space and of labor have resulted from the application of fully automatic control of temperature, flow and air circulation to the "Frings" patented design of vinegar generator.**

IN the older type of Frings vinegar generator (see FOOD INDUSTRIES, June, 1935, page 277), three methods of control were employed. This gave what was then regarded as complete control of the entire operation. However, improvements resulting in what is called the Frings "Automaton" generator, have since been made, rendering the control of operations fully automatic.

To understand these improvements, it is necessary to refer to the older model, which maintained control of the bacterial oxidation of alcohol to acetic acid by:

1. Maintaining a metered rate of circulation of the mix,
2. Cooling the mix by water to the most favorable temperature of operation,
3. Regulating the quantity of air allowed to enter the generator.

It was not difficult to control the operation of the older type of generator, if the operating rules were strictly followed. But, unfortunately, careless or capricious operators too often used their own—frequently incorrect—ideas of operation. Often this caused damage to the vinegar bacteria or other types of loss. This led the inventor, Heinrich Frings, of Bonn, Germany, to design this new "Automaton" generator.

This improvement does not represent a new system of vinegar manufacture but involves the perfection of the control through the use of electromagnetically actuated valves, so that most favorable temperatures are definitely obtained. These valves control the rate of circulation of the mix, the rate of flow of cooling water used to cool the circulating mix and the rate of air circulation.

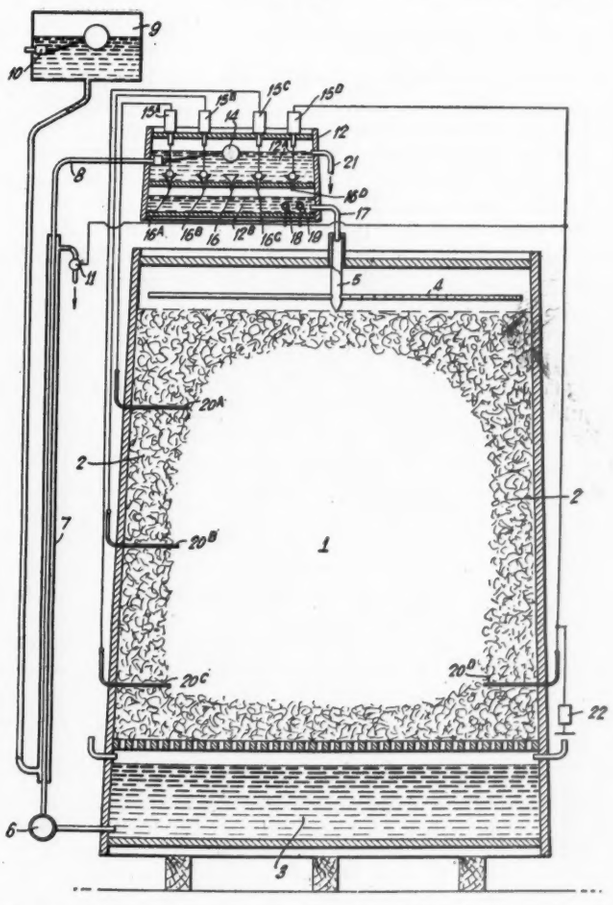
Referring to the accompanying sketch, showing a cross-section through an "Automaton" generator, the process operates as follows:

The generator (1) is equipped with a false bottom of grid construction upon which a charge of beechwood shavings (2) rests.

Below the false bottom is a collecting chamber (3) into which the mix is introduced. The pump (6) delivers mix from 3 through the cooler (7) by means of the pipe 8 to 12A, the upper part of a feed tank that is placed above the generator. The operation of the pump (6) is controlled by a float valve (14) located in the feed tank (12A) where it maintains a constant, predetermined level. From 12A the mix flows through the outlet funnel (16) to 12B, the lower part of the feed tank, and from there through pipe 17, to the revolving spray pipes or spargers, (4) and (5), which distribute the mix over the top of the bed of shavings in the generator.

Bacteria in the generator begin to oxidize the mix and, of course, the generated vinegar gradually increases in temperature. Ultimately, the warm vinegar flowing from the shavings in the generator into the collecting chamber (3) reaches the highest permissible temperature. When this occurs, the thermocouple 18, set for this limiting temperature, causes the water valve (11) to open, allowing cold water from the pressure tank (9) to pass through the cooler (7). In this manner, the temperature of the circulating mix is automatically adjusted to the proper level.

Operation of the generator and the accompanying rise in the temperature of the mix cause the temperature of the charge of shavings to rise. When this temperature rises to the most favorable point at the level of the thermal element 20A, the circuit of the electromagnet 15A is closed, opening




Diagrammatic section through the improved "Frings" type of vinegar generator, showing method of applying the automatic controls.

the valve 16A, thus allowing an accurately measured additional amount of mix to flow from 12A to 12B and hence to the rotating spray. A similar sequence of events occurs when the temperature reaches the most favorable level at the thermal elements 20B and 20C.

When the three electromagnetically operated valves 16A, 16B and 16C are all opened, as just described, the generator is operating at capacity in normal manner. The thermal elements open and close the valves and control temperature by adding more or less of the mix, which itself is adjusted to proper temperature.

But a vinegar generator will at times develop too much heat, even with the foregoing adjustments. So, in order to remove still more heat from the charge of shavings, thermal element 20D is provided. At a predetermined temperature, this element actuates electromagnet 15D and valve 16D, allowing still more mix to flow from the feed tank 12A to the generator. The level of the mix in 12A is determined by an overflow pipe (21), which allows any excess of mix that may be pumped to 12A to bypass the generator and flow back to the collecting chamber (3).

### *Air Ventilation*

Ventilating a vinegar generator and providing suitable air circulation have always been the most difficult problems in vinegar manufacture. The air has two important functions: It enables the bacteria to breathe and it provides (together with alcohol) their nourishment. In this new Frings generator, air is provided by means of a fan, driven from the mix pump motor. It is blown into the generator at a point below the wooden grating. This entering air is controlled at the correct amount for the generator output.

Excess air discharged from the generator would carry out both vinegar and alcohol, thus reducing the yield. In contrast, too little air restricts the activity of the bacteria, thus also reducing yield. To avoid these troubles, the controlled air supply proportions the air to the desired output of vinegar.

This ventilation also provides adequate air circulation, important especially during the summer when high outside temperatures might otherwise make operation difficult. As the air is introduced below the charge of shavings, it circulates upward, counter-current to the flow of the mix.

When the fermentation rate in the generator rises to a point that makes necessary an additional flow of air, the same thermal element (20D) which provides the final increment of mix feed also actuates an electrically operated air valve (22) and allows additional air to enter the generator.

With all this control now available on the "Automaton" vinegar generator, few duties remain for the operator. All he has to do is to pump out the finished vinegar from the generator at the proper time and to charge fresh mash into the generator. For example, if a charge of vinegar is finished in seven to eight days, the operator has nothing to do with that particular generator during the first five days after introducing the fresh mash, for the "Automaton" works reliably day and night alone. After that lapse of time, the operator should make acid and alcohol tests, repeating at intervals until the tests show that the finished vinegar charge is ready to be pumped out.

### *Output Increase*

While the purpose of developing this automatically controlled vinegar generator was to facilitate the work of the operator, it has been found that, by keeping the operation under uniform control, the bacteria double the vinegar output. In this connection, the duties that still remain for the operator are very important in securing for the bacteria the necessary steady good living conditions. For example, should the operator remove the vinegar from the generator without any alcohol content, the bacteria would be greatly harmed.

Furthermore, it is important that the fresh mash shall not be heated in the winter time, as is done by some operators of the older type of Frings generators. The vinegar bacteria do not thrive with such artificial warmth, preferring self-generated heat. This heating practice was followed through fear that the cold mash might render the generator too cool, but by proper methods undercooling can be avoided. The cool mash charged into the generator actually increases the output of the bacteria. Heating of the mash is often responsible for restricting vinegar production in springtime and time must elapse before the generator again works properly. The skilled operator is in full control of the Frings generator and can avoid undesired production fluctuations. He is able to keep production steadily at the highest possible level.

By applying some of the operating methods of the "Automaton" generator to the old type Frings generator, especially the new altered optimum temperatures, the vinegar production of the latter can be considerably increased. Operated in this way, old type Frings generators are able to produce a batch of 2,500 gal. of 104 grain vinegar in 4 to 6 days, instead of 8 to 10 days.

The "Automaton" generator, however, produces twice the vinegar that the old type Frings generator did from a given quantity of shavings. Savings indicated are 50 per cent in floor space and building, 50 percent in shaving fillings, 50 percent in vinegar bound by the filling, 40 percent in tank space, 50 percent in electricity and about 70 percent in labor. Thus, with the standard type 4x8 ft. generator, the building and operating costs of a vinegar plant producing annually about 400,000 gal. of 100 grain vinegar are at least four times these costs with the "Automaton" generator.

Yield of the "Automaton" generator is 92 to 94 percent, that is, from each 1 deg. proof alcohol put into the generator, 4.6 to 4.7 grainage of vinegar is produced. In contrast, experience shows that a 4x8 ft. standard generator shows an average yield of only 70 per cent. A higher yield than 94 percent is impossible, because some alcohol must be left in the vinegar, and the breathing of the bacteria causes a further natural loss.

Experience that I have had in Europe showed that "Automaton" generators produced daily between 600 and 1,000 gal. of 104 grain vinegar, with a charge of 40 cubic meters (1,400 cu. ft.) of shavings. This is three to six times as much per cubic foot of shavings fill as the output of well-operated 4x8 ft. standard type generators. Some vinegar plant operators will be surprised to learn that "Automaton" generators are sometimes operated with a steady, day and night, mix circulation rate of 1,600 gal. per hour and that two sparger arms are not sufficient. For this reason four of them are installed, to carry out the important basic principle of the recirculating generator system, of having the mix uniformly distributed over the charge of shavings.

### *Flexible Operation*

An additional advantage of this new generator (also in part of the older Frings-type generator) is that the manufacturer can adjust vinegar production to demand. It is possible to reduce the output to one-third of normal, and then, if necessary, to raise it again to full capacity, without harming the bacteria. This feature helps to avoid the trouble and expense of storing vinegar. Specially constructed "Automaton" generators produce vinegar of quality equal to that stored for at least 12 months in wood, and can produce 125 to 135 grain vinegar at a satisfactory speed.

This new design of vinegar generator was introduced in Europe by Heinrich Frings in 1937.

# The Wartime Picture Of Tin Supplies

By ERIC HARDY, Liverpool, England.

**Light on what lies ahead for industries dependent upon supplies of tin is given by this article. The British Empire can meet the needs of the democracies if ships are available. The Axis controls less than 0.8 percent of tin supplies.**

TIN is not found in the United States. It is found in England and parts of the British Empire. Shipments of tin are presumably essential to the American canning industry, and means of exchange are essential to the British war effort. Tin, therefore, can figure prominently in the Anglo-American war and trade effort. Tin is an essential war material, which places some restriction upon supplies. And the British canning industry has greater needs than ever before, for we are developing this branch of the food industry as much as we can.

### *Malaya Supplies Most U. S. Tin*

Most of the tin used by American manufacturers is Straits tin, which the British Empire is able to supply from British Malaya. The 1940 output from this source was 85,384 tons, by far the largest tin output of any country in the world and nearly twice the output of the next largest producer, the Dutch East Indies. American ships carrying goods to the Red Sea on the new lease-lend route could return with Straits tin.

Malaya's tin output has doubled since the last world war, but on the other hand, Australia's supplies are diminishing, and from a 6,000-ton output in 1910 her mines fell back to only half that production in 1939.

British mines can also supply tin from Africa. In Nigeria, West Africa, an insignificant production at the time of the last war has been developed to such an extent that Nigeria now rivals China for fifth place as world's tin producer, with an annual production of over 10,000 tons. Burma, too, could supply tin to American ships returning from the Red Sea route, for like Nigeria, this part of the British Empire has been developed in recent years and now it has an annual output of nearly 6,000 tons.

Tin ore concentrates from Burma mines are now being smelted in British Malaya instead of Britain. After smelting, the refined tin is being shipped back to India and used for the production of tin plate for the manufacture of kerosene tins.

Britain itself is no longer in a position to export tin, but still exports tin plate, although she was the originator of the world's tin trade. The tin mines of Cornwall are only making a third of their production figures of the last war for they are slowly being exhausted, and Britain imports a certain amount of tin.

Of other friendly democracies with tin resources, Bolivia had an output of 37,940 tons in 1940, the Belgian Congo mines produced 9,663 tons in 1939 (the latest available statistics), the Dutch East Indies had 44,447 tons in 1940, Siam or Thailand produced 17,447 tons, China 10,859 (1939), the Argentine has increased production to nearly 2,000 tons a year and neutral Portugal has increased its output to 1,360 tons.

The only Axis country producing tin is Japan, with an output of 1,700 tons in 1939 compared with only 23 tons in its undeveloped state in 1910. Miscellaneous sources scattered elsewhere in the world could not produce much more than five or six thousand tons

*Harris & Ewing*

**The British are using more and more tin for food containers as their canning industries expand not only in England but in the dominions. This picture, taken in a canning plant in Toronto, Canada, shows a shipping department working full blast to dispatch canned and packaged food to England as fast as it can be processed. Food in tin cans is protected against poison gas.**

a year, so that the British Empire controls 45 percent of the world's tin, her Dutch and Belgian allies control a further 23 percent, and the Axis powers less than 0.8 percent.

### *Malaya Ore Rich*

The only tin-containing mineral of commercial importance for the tin plate industry, meeting the can and tin-box needs of food manufacturers, is cassiterite, or tin dioxide, and production depends much upon the content of the ore. This is so high in British Malaya tin mines that the average metal content of their ore is 75.5 percent, only 3 percent less than chemically pure tin oxide. This is chiefly in Selanger, Perak and the Kinta Valley. And the strongly fortified and well-garrisoned base at Singapore, used jointly by British, Australian and American naval forces, is a safeguard against those

(Turn to page 90)

# Jam Jar Standardized For Army and Public

**New preserve jar developed by Glass Container Association for Army purchases of glass-packed fruit jams. Container also meets approval of housewife and is adopted as regular commercial package**

COMPLETE specifications have just been issued on the standard 2-lb. "Tabl-Serv" round preserve jar, designed for Army use by Glass Container Association, and first announced some months ago (FOOD INDUSTRIES, March, page 69). The jar, developed to meet the requirements of the National Preservers Association and the Quartermaster General's office, is a wide-mouthed, re-sealable container, compact for the quantity it holds, with height reduced so that a tablespoon can reach to the farthest corner.

Advantages, built into its design, are such that the jar has become a standard commercial preserve container, in demand for home use as well as in Army quarters. The 11-oz. glass container is suitable for table use; its resealing closure means economy in the use of preserves; it is non-tippable, compact and space saving, and it is designed so that the average serving spoon can be used with it conveniently.

The design specifications given here have been issued to all glass container manufacturers and to all preservers. Since the diagram of the container (No. C-760) has been specifically named in the Quartermaster General's order, only the specifications contained therein are approved by the Army. All 2-lb. Tabl-Serv preserve jars, no matter who manufactures them, are identical except for differences due to various closures. The cartoning is also standardized. While the Army announcement provides for shipment of either 12 or 24 jars to the case, the industry recommends that bids be restricted to 12-jar cases.

Modernized design has effected a saving in the amount of glass used in the container, making it lighter. The empty jar weighs but 11 oz., whereas a jar of this capacity would have weighed at least 16 oz. several years ago.

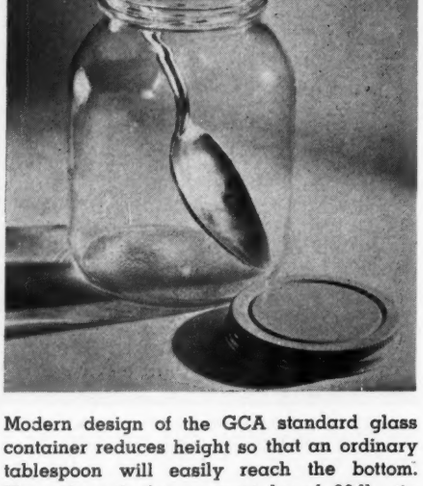
### Closure Specifications

*Type of Seal*—Hermetic.

*Material*—80-lb. tin plate, minimum. Gold lacquer outside. Acid-resistant coating inside.

*Liner*—Rubber or rubber compound suitable to product to be packed and providing a hermetic seal.

*Finish*—70 GCA No. 400 continuous-thread, or any standard commercial closure finish.



Modern design of the GCA standard glass container reduces height so that an ordinary tablespoon will easily reach the bottom. Hermetic-seal closure must be of 80-lb. tin plate, with gold lacquer outside and acid-resistant coating inside.

### Case Specifications for Domestic Shipment

*Cartons*—200-lb. Mullen test, special center slotted, all flaps to meet in center. Exterior facing to be jute or water-finish kraft. Inner facing to be jute or dry-finish kraft. Corrugated medium to have an "A" flute.

*Partitions*—Full height. Facings to be 16-point chip or 16-point dry-finish kraft. Corrugated medium to have an "A" flute.

*Side and End Liners*—Full height. Facings to be 16-point chip or 16-point dry-finish kraft. Corrugated medium to have an "A" flute.

*Number of Containers in Carton*—12.

*Outside Dimensions of Carton*—17 1/16 x 13 x 6 in. (Approx.).

*Weight per Carton*—10½ lb. (Including carton, empty jars and caps.)

### Case Specifications for Export Shipments*

*Case*—Tight, wood, nailed, outer case to hold one corrugated domestic case containing 12 jars.

*Material*—Yellow pine or gum with iron strapping. Ends ⅜ in., sides, top and bottom, ¼ in.

*Outside Dimensions of Case*—18 5/16 x 13½ x 16½ in. (Approx.).

*Weight of Wood, Outer Box Only*—4½ lb. (Approx.).

* The above specifications are for shipping containers designed to stand extremely rough handling.

### Notes on Container

1. This container has been accepted by the War Department. All specifications as to container, closure and shipping cases must be rigidly adhered to when supplied for U. S. government.
2. For identification purposes, glass manufacturer's trade-mark should be shown on bottom of container.
3. Tolerances for capacity, weight and body dimensions are to be in accordance with GCA No. 1 standard tolerances.
4. Bottom to be stippled.
5. Full label space of 2⅜ in. to be maintained.

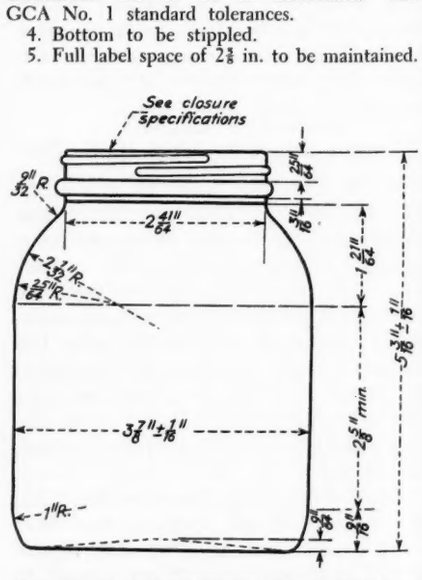



Diagram of GCA standard glass container, giving all dimensions. The weight is 11 oz.; capacity, 24½ oz.; filling point, overflow.

# MARKETS

World Chaos Opens New Market for Domestic Wines • Changes in Ice Cream Consumption

# War Creates Market For American Wines

By ALLEN CHAFFEE, New York, N. Y.

**Disarrangement of world markets by the war offers Western Hemisphere wine makers a tremendous opportunity to build a new and lasting business in fine wines. The steps that are being taken to profit from this opportunity are related here.**

DISLOCATION of the world's wine markets by the present international chaos offers a challenge to American business men. It gives them a tremendous opportunity to build new and lasting business in fine wines.

The British war blockade has cut off most shipments of wine from France, Italy, Hungary, Germany and other European countries, though limited amounts of Spanish and Portuguese wines are being shipped from England and Lisbon. The shortage is leading to increased demands for fine wines from Chile and Argentina, and is opening a new market for American makers of fine wines.

There are firms in the United States that find their supply of famous European wines nearly or completely exhausted. Those firms having a small stock of imported wines on hand sometimes request the retailers to make two-thirds of each order a domestic American wine. However, Sandeman ports and sherries are still getting through the blockade, according to Frank Desmares, representative of Sandeman & Co., as are also the Romate sherries (F-C-6 Importers, Inc.) from Spain. If the supply of wines to this country were cut off, the stocks would not last beyond the end of this year.

H. G. Beattie, associate in research at the New York State Agricultural Experiment Station at Geneva, New York, states that the present European situation has had a very definite, beneficial effect in stimulating the business of the New York State wineries. The supply of wines from France has been cut off, and this has increased the demand for the dry wines and champagnes of western New York. It has been reported that many of the better vineyards of France have been pulled out so that the land may be used for raising potatoes. If that is the case, it seems as though the demand for our wines would be much greater even after the cessation of hostilities.

### *American Wines*

In the United States there are limited quantities of really fine wines. However, research into better procedures of wine making is being extended, and these wines are coming increasingly into their own. California, New York State and Ohio are the chief sources for the supply of fine American wines. And there is even a tendency to give distinctive American names to the wines in place of imitation European names.

California is fortunate in having a dependable and comparative freedom from wine pests and diseases. After the World War I, California acreage doubled for ordinary wines, but not for fine wines. By 1933, Prof. F. T. Bioletti of the University of California, who died about two years ago, was urging California wine makers gradually to accumulate stocks of fine wines and subject them to "a slow aging

American domestic wines having labels that are suggestive of the place of origin and the name of the grapes.

under conditions established by secular experience." For such wines, he said critical people would be willing to pay in accordance with the higher cost of production. He declared California needed wine makers who would build a reputation by devoting the necessary time and care to building up a permanent market. This market was to be based on good quality wines made from the rarer and more costly grapes.

In a bulletin published by the University of California in 1940, M. A. Amerine and M. A. Joslyn give some useful information about wine making. They state that large-scale equipment and bulk handling—recommended for ordinary wine making—are usually not satisfactory for fine wines. They also verify the idea of Prof. Bioletti that quality grapes, with their low production, do not pay the growers. For fining by natural settling of suspended material in wines, they recommend the use of egg albumen or isinglass for certain light wines instead of casein or gelatine. For bulk wines, fining with bentonite, a special clay from Wyoming, is largely replacing other methods.

### *Wine Research*

The University of California has started a research in the medicinal qualities of wine. The experiments will include experimentation to determine the vitamins in wine and alcohol metabolism, and a study to determine the effects of wine on human digestion.

In the Finger Lakes region of New York State there are several wineries that copy the French champagne technic, vault construction and wine-making equipment. The basic wine is a blend, known as cuvèe, of which Catawba wine is the chief base, with Delaware second. The vines producing these grapes yield well in New York's Keuka Lake region and in the Lake Erie district of Ohio. Since both Catawba and Delaware are a little too acid, these are blended with the more neutral Iona, Diana, Elvira and Dutchess wines. Sometimes California wines are used to cut down the high acidity of the Eastern wines and introduce certain bouquets.

For sparkling burgundy, similarly made, the red wine grapes most used in the East are Ives, Clinton, Eumelan and some of the above-named champagne types, according to Senior Bacteriologist Harry E. Gorseline of the Agricultural Chemical Research Division of the U. S. Department of Agriculture. For two years, he says, fermentation is controlled by the use of pure yeast and comparatively low temperatures, and casks of small size are used for storage in order to secure aging by oxidation without undue spoilage from acetic frementation. Just prior to bottling, a blend is made, rock candy added, and the mixture inoculated with a selected strain of yeast. The secondary fermentation takes place in heavy, dark green bottles. Corks are secured with steel straps called "agraffes." The bottles are then placed in tiers in vaults where the temperature can be carefully controlled. Here a secondary fermentation converts the added sugar into alcohol and carbon dioxide. A temperature of precisely 64.4 F. is maintained until a vigorous fermentation has started, then is gradually lowered. The bottles lie in storage to age, and at the end require from three to six months for clearing. They are then placed upside down in a freezing brine so that the inch of wine next to the cork is frozen solid. In that way the sediment can be disgorged. But the space so vacated in the bottle must be refilled under pressure to avoid loss of gas, and "dosed" with a delicate amount of sirup, an operation that calls for great skill.

**Two high-quality Argentine wines being imported by Park Benziger & Co., Inc. These wines are replacing European wines cut off by the war.**

Associated with Prof. Gorseline in his studies of sparkling wines are F. M. Champlin of the Pleasant Valley Wine Co. at Rheims, N. Y., and Dr. D. K. Tressler of the New York Agricultural Experiment Station at Geneva. A new process designed to hasten wine production has been perfected by Dr. Tressler. This method, patented by the Cornell Research Foundation, Inc., has been in use since 1938 and is claimed to produce excellent burgundy, port and sherry from Concord and other "Labrusco blood" grapes, an abundance of which are grown in the East despite their "foxy" flavor, which the Tressler process is designed to remove.

Prof. Gorseline and Carl S. Pederson of the station at Geneva have also worked out an improved method of pasteurizing New York State low-alcohol wines, which can be stabilized by pasteurizing them for only 20 minutes at 130 deg. F., whether in closed or open bottles. It had been found that oxygen in the head space of the bottle caused undesirable changes in tokay, sauterne, port and burgundy; but when the bottle is completely filled with hot wine and immediately closed, a vacuum is produced upon cooling which holds undesirable changes to the minimum.

### *Distinctive Names for U. S. Wines*

California, New York and Ohio table wines are improving, according to a statement made by Mr. Frank Schoonmaker, dealer in domestic wines. This statement was based on tests made on wines selected from various wineries throughout the country. Mr. Marvel, who is associated with Mr. Schoonmaker, states that the trade is gradually accepting the domestic wines where previously they had only imported wines.

Mr. Schoonmaker feels that it is very important to introduce high-grade domestic wines under individual names that are suggestive of the place of origin and the name of the grapes. In France, Bordeaux, Burgundy, Chabils and Champagne give their place names to the wines they produce. The same idea is proposed for wines produced in the United States. Examples would be as follows: for California white wines, Mountain Sylvaner 1939 (a piquant wine that matures early); and Sonoma Sylvaner 1937 (an exceptionally successful product of a small acreage in Sonoma County); for New York, such names as Lake Delaware 1937 or 1939 and Lake Elvira 1939; for Ohio white wines, Island Catawba 1937 and Island Delaware 1934 would be appropriate. In addition to the names mentioned above, the label would also bear the name of the producer.

The acreage from which California fine wines may be produced is only a tenth of that from which her excellent bulk wines are made. Where flavor rather than quantity of fruit is desired, a thin, gravelly soil is best. The grapes

are not the big, juicy kind. Pinot Noir, for one, is a dwarf grape that grows on a toy-like bunch.

### California Wines

The California wine industry of today really started with vines brought from northern Europe during the time of the gold rush. Today the State's wine industry is worth over $420,000,000. A few big companies, four in particular, make most of California's bulk wines, as well as a small percentage of its fine wines. The four large companies are the Roma Wine Co., Inc.; Fruit Industries, Ltd.; Petri Wine Co.; and Italian-Swiss Colony. Some of the companies also make commercial quantities of berry wines from blackberries and loganberries grown in Oregon and Washington and rushed to northern California by refrigerator car.

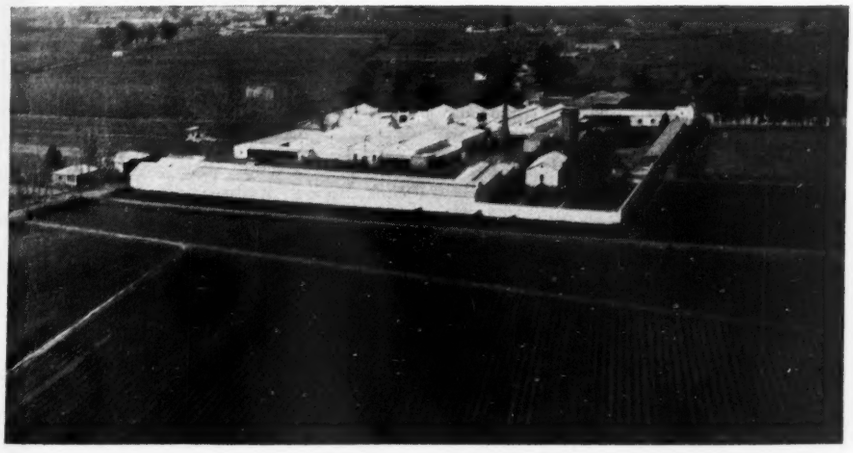
While the war blockade has had relatively little effect on sales of California wine, for years prior to the war most of the State's extra quality wines were distributed only within California. Now they are beginning to get national distribution.

Sales of California wines had, by March, 1941, reached the highest level in their history. Out-of-the-state markets accounted for the better part of this increase over previous years. In 1939 California wines of all types amounted to 46 million gallons, and by 1940 to nearly 56 million gallons. Foreign wines consumed in the U. S. in 1940 amounted to only 3,602,162 gal., according to government figures, and in 1938 amounted to 3,399,413 gal. The figure for U. S. wine consumption in 1940 was, roughly, 86 million gallons, and for 1938 nearly 64 million gallons. The 1940 breakdown was as follows:

| Still wine (gal.) | | | |
|---|---|---|---|
| Dry | Sweet | Vermouth | |
| 25,687,963 | 59,049,309 | 719,384 | |
| Sparkling wine (gal.) | Total wine* (gal.) | | |
| 743,677 | 86,200,333 | | |

*Figures based upon report by the U. S. Treasury Department, Bureau of Internal Revenue.

B. B. Turner of Roma Wine Co., Inc., says that the war has injured rather than helped the wine growers of California. On the credit side he points out that the "carriage" trade customers, unable to get imported wines, are trying California's choiest wines, champagne and vermouth. Therefore, the producers have a chance to recapture the export market lost during Prohibition. On the debit side, quantities of raisins and table grapes normally sent abroad have been forced upon the wineries. He says that the present improved conditions in the industry, including firmer prices, exist in spite of the war and not because of it. He points out that Central and South America, Asia, Oceania and the islands of the Caribbean are largely cut off from most of their normal sources of wine shipments. It is to these markets that California may now look for increased export sales.



Bird's-eye view of a winery and vineyards located in the Province of San Juan, Argentina.

### Wines from South America

A number of firms are importing small but increasing amounts of fine wines from the foothill regions of Chile and Argentina, though opinions differ somewhat as to the evaluation of these wines. Chile produces something comparable to the bordeaux type of white wine and Chile's clarets are excellent. Its riesling wines are very similar to the dry German Rhine wine, though Chile's soil and climatic conditions are slightly different. Chilean wines have been used for the last five years to partially supply our hotel trade and have met with a limited success. Plans for the immediate future include distinctive labels for Chilean wines. There will, for instance, be a so-called Great White Wine and a Great Red Wine.

Granted, however, that wines like Sandeman's port and sherry cannot be duplicated, it is still possible for Chile to produce an acceptable product, one more nearly comparable to the "fine" wines of California.

Argentina has immense vineyards in the foothills of the Andes. It supplies its own population with wines of every type. G. H. Mumm has been receiving large shipments of "Globo Sweet" and dry vermouths. Park Benziger & Co., Inc., of New York City, is just getting its initial shipment of Argentine port, chianti and vermouth. Mr. Benziger says they are not going to bring out imitations of French and Italian wines, but a real Argentine product labeled as such. The firm is endeavoring to find distinctive Argentine wines and build up a market that will endure even after European products are again available. The Argentine Export Commission is planning on introducing quality inspection stamps to identify standard quality goods.

R. H. Garey, vice-president of W. A. Taylor & Co., Inc., New York City, says that the Martini & Rossi plant in Buenos Aires is now using labels for its Argentine wines that closely resemble those formerly used on its Italian imports. This plant has for 25 years been making a 15.95 percent alcohol vermouth for the Italian popu-

Wines stored in hand-cut limestone tunnels in a hillside, at Beringer Bros. Winery, St. Helena, Napa County, Calif.

lation in Argentina. This vermouth is a sweet type which has infused into it a great variety of herbs similar to those used in Italy. There is also an 18 percent dry vermouth made for other customers who prefer it. The latter type has been shipped to the United States since last September by Martini & Rossi. They also have just begun to ship a chianti type of wine.

Mr. Garey says the November, 1940, importation of Argentine vermouth was just under 17,000 gal., but by December, 1940, it had increased to nearly 46,000 gal. While these amounts are not as large as those once received from Italy, they are increasing each month, despite the long freight route.

The consensus of some wine experts was that while Chile, like Argentina and the United States, makes wines excellent in their class, there can be no real comparison to the fine European imports.

# Salaries, Seasons And Ice Cream Sales

**While consumption varies widely with incomes and the weather, production is becoming more uniform in recent years, indicating what a food industry can do by promotional effort.**

CONSUMPTION of principal manufactured dairy products has steadily increased since 1930. During the last decade, consumption of evaporated milk has doubled, that of cheese increased some 40 percent, and butter purchases have been augmented approximately 35 percent. The trend in ice cream consumption, though upward, has not been steady. In fact, in 1933, ice cream purchases were only two-thirds of the 1924-29 annual average sales. Ice cream differs in this respect from all other manufactured dairy products.

The perishability and low temperature at which ice cream must be kept cause it to be produced close to the market, where consumption usually takes place immediately. Most of the commercial ice cream is manufactured in the northeastern section of the United States, where the majority of the large cities are located. In 1939, New York was the leading state in production of factory ice cream, followed by Pennsylvania, Illinois, Ohio, California, Michigan and Massachusetts. These states would follow in essentially the same sequence were they listed according to the size of their urban population.

Ice cream prices, being relatively inflexible, have probably not been of great significance in causing changes in its consumption. Variations in the purchasing power of urban population have been the main cause for the yearly changes in ice cream consumption. Owing to the elastic demand, ice cream sales fluctuate much more violently than does the purchasing power of consumers who are city inhabitants.

Just as total consumption of ice cream fluctuates directly with the purchasing power of the urban consumers, so does individual consumption vary with the income level. The effect of the income of non-relief urban families in 1935-1936 on their purchases of ice cream as compared with evaporated milk and butter is shown in Fig. 1, based on a recent publication of the U.S.D.A.[2] Per capita purchases by families at each income level are represented as percent of the purchases of the "base families"—those having an annual income of $1,200.

Quantities of evaporated milk purchased by families having an annual

(Turn to page 91)

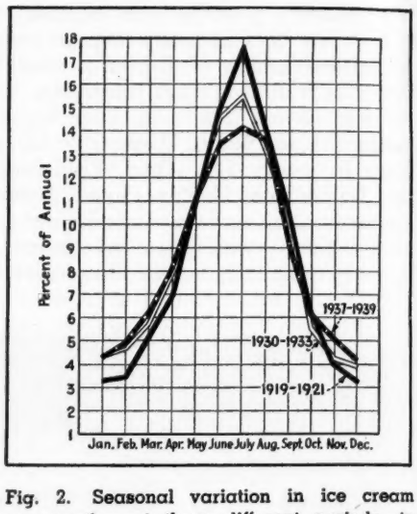



**Fig. 2. Seasonal variation in ice cream consumption at three different periods, in percent of annual consumption.**

| Period | I | II | III |
|---|---|---|---|
| Years | 1919-1921 | 1930-1933 | 1937-1939 |
| Month | | | |
| January ... | 3.3 | 4.3 | 4.2 |
| February .. | 3.4 | 4.6 | 4.9 |
| March ..... | 5.2 | 5.7 | 6.2 |
| April ..... | 6.9 | 7.7 | 8.1 |
| May ..... | 10.7 | 11.1 | 11.0 |
| June ..... | 15.0 | 14.5 | 13.3 |
| July ..... | 17.6 | 15.5 | 14.1 |
| August .... | 14.1 | 13.1 | 13.6 |
| September .. | 10.6 | 9.6 | 9.2 |
| October .... | 6.1 | 5.5 | 6.1 |
| November... | 3.9 | 4.2 | 5.1 |
| December... | 3.2 | 3.9 | 4.2 |

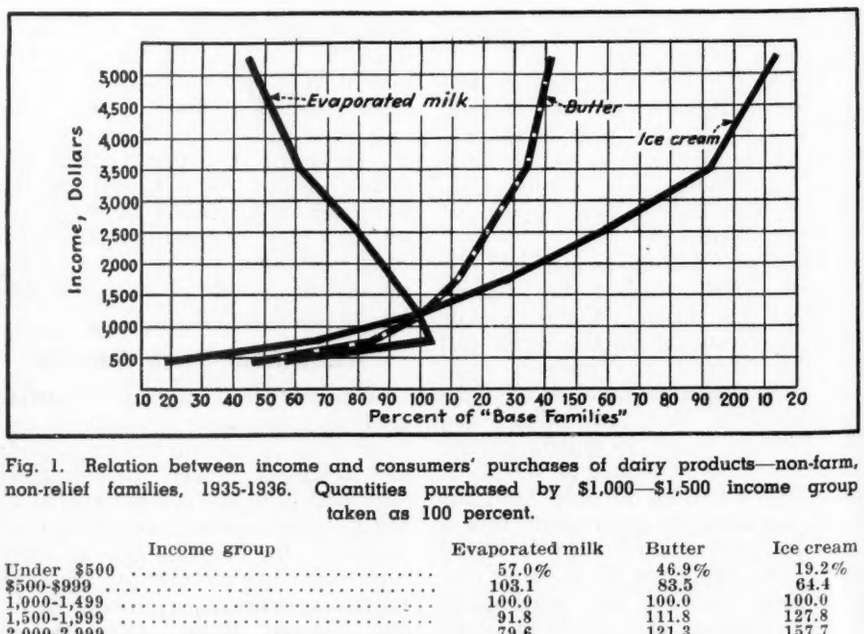



**Fig. 1. Relation between income and consumers' purchases of dairy products—non-farm, non-relief families, 1935-1936. Quantities purchased by $1,000—$1,500 income group taken as 100 percent.**

| Income group | Evaporated milk | Butter | Ice cream |
|---|---|---|---|
| Under $500 | 57.0% | 46.9% | 19.2% |
| $500-$999 | 103.1 | 83.5 | 64.4 |
| 1,000-1,499 | 100.0 | 100.0 | 100.0 |
| 1,500-1,999 | 91.8 | 111.8 | 127.8 |
| 2,000-2,999 | 79.6 | 121.3 | 157.7 |
| 3,000-4,999 | 61.2 | 133.9 | 192.4 |
| 5,000 and over | 44.9 | 141.8 | 212.3 |

# How Shall We Label It?

By GORDON W. McBRIDE
Chemical Engineer, Washington, D. C.

**Many of your questions about how to label foods under the new Federal food law will be answered in this article. The author discusses the principles embodied in more than 200 answers made by the Food and Drug Administration to inquiries from the industry.**

THE many food-labeling problems raised by the Food, Drug and Cosmetic Act of 1938 really would justify calling that Act the "food labeling law," rather than the "pure food law," as its predecessor was popularly known. For over three decades food manufacturers had been complying with the pure food provisions of the Food and Drug Act of 1906, so the continuation of those features raised few new questions. However, the labeling provisions in the 1938 act have created an entirely new set of problems.

As to the scope of the law, a "food" is any article "used for food or drink for man or other animals" or "for components of any such article."* All food in package form must display prominently, in addition to net weight and name of manufacturer, the common or usual name of the food. And, if composed of two or more ingredients, all ingredients must also be declared, unless it is a product for which a standard has been established.

Such a standardized product need not declare all of its ingredients. In most cases, however, those products which have so far been standardized leave to the manufacturer some choice from a list of optional ingredients. When any of these optional ingredients is used it must generally be declared on the label, even though the product is "standardized."

Fortunately, or otherwise, depending on how one feels about standards, most foods do not lend themselves to standardization. Opinions of consumer groups to the contrary notwithstanding, variety rather than standardization is the goal of most food manufacturers. Of course, when a product is widely popular, there is a natural tendency for other manufacturers to imitate it. But, in general, food manufacturers try to make their products not only better than their competitors', but also distinctive.

### *The Common Name*

The choice of a common or usual name for the average food product is a fairly simple one. Of course, each manufacturer will probably also want his own trade or brand name. Although this is optional, most manufacturers do have such preference and make the trade-name the most prominent recognition feature of the label. However, no matter how well known this trade name may be, the label must in addition reveal the common or usual name of the product.

One interesting type of common or usual name is the double name, of which "ginger snap," "vanilla wafer," and "fig bar" are all illustrative. In the case of any of these double names, however, the word "snap" or "wafer" or "bar" alone could not be called a common or usual name. It is only when these words are used together with "ginger" or "vanilla" or "fig" that they immediately present a well-known commodity to the consumer's mind. It is because these phrases have achieved general public understanding and acceptance that they qualify as an adequate label name.

In some cases a common or usual name may result from long use of what was originally a trade-name. One example is the word "saltine." Perhaps a better known example of this is "shredded wheat biscuit." This also was originally a trade-name; but it was not wisely chosen to be retained exclusively by the company which developed it. The result has been that any food manufacturer may now make a product resembling the original shredded wheat and call his new product the Blank Company Shredded Wheat Biscuit. Moral: Choose your new trade-name wisely and protect it with a trademark, unless you want to run the risk of creating (in time) a new common or usual name.

### *The Ingredient Problem*

Now as to the ingredients of the food product, having settled on a common or usual name. In general, this is not a difficult problem: All ingredients should be specifically listed on the label in order of quantity present. As to how

No wonder this executive is puzzled as he looks at the fancy new package. Plain or fancy, food packages pose a multitude of labeling problems under the Federal Food, Drug and Cosmetic Act. This article is intended to solve some of the puzzles.

*Chewing gum is also specifically defined as a "food."

to describe the ingredients, here again the rule is fairly simple: Use the common or usual name. But the common or usual name of the ingredient is generally indicated by the manufacturer of that ingredient, so he has solved that part of the problem for you.

If you use a standardized product as an ingredient in your product, the ingredient listing on the label of your product may include any one of the optional names which the ingredient manufacturer might have legitimately chosen for his product. If more than one type of that ingredient is used, each should be treated as a separate ingredient. For example, if white flour and soybean flour should both be used in a single product, these two flours should be separately declared in the listing of ingredients, in the proper sequence depending on the relative amounts used.

Important to remember is that listing of a standardized product as an ingredient *must* be by its standardized name. And a product which has *not* been standardized may not be listed by any of the names which may be used for a standardized product. This would be regarded as deceptive practice.

About the only thing to look out for is that there is not some *unusual* component in one of the ingredients which is being used. Lecithin in a shortening would be an example of this. Most shortenings do not contain lecithin. If for some perfectly good reason it should be preferable to use a shortening which does contain lecithin, the product labeling would have to list lecithin as an ingredient.

### *Artificial Colors, Flavors*

Artificial colors and flavors sometimes present a little problem too. If the manufacturer wishes to use an artificial color in his product, it must be conspicuously labeled "artificially colored." On the other hand, if some *ingredient* of his product is artificially colored, but does not impart this color significantly to the finished product, then artificial coloring need not be declared.

A comparable problem is raised by artificial flavors. Vanillin is the traditional example of artificial flavors. However, the average consumer has long since ceased to regard the phrase "artificially flavored with vanillin" as a deciding factor in making a purchase. On the other hand, if an artificial flavor is used, no matter how well known it may be, the words "artificial" and "flavor" must appear prominently on the label.

The Food, Drug and Cosmetic Act has occasioned considerable correspondence between food manufacturers and the Food and Drug Administration, principally on questions of labeling of specific commodities. There are presented below a few representative summaries of the "answers" which the Food and Drug Administration sent back to some of the inquiring manufacturers.

### *Answers by FDA*

Unwrapped products require no label, because they are not "food in package form." On the other hand, if even a sticker label is used on an unwrapped product, that sticker must comply with all label requirements.

The ingredient statement on individually wrapped five-cent products may cover ingredients common to all varieties. A supplementary sticker would be necessary to declare the characterizing ingredients in any particular package.

Labeling of a food product should list as ingredients only those materials which are actually present in the finished product. Water, if removed during the baking process, need not be declared as a bread ingredient. Other examples will immediately come to mind of ingredients which are added somewhere in the preliminary mix but lost by evaporation, or changed in chemical identity, before the product is consumed.

An example of this latter type is seen in the ruling that pretzels should declare as an ingredient a trace of sodium carbonate rather than caustic lye. It is true that caustic lye is used in the manufacture of the pretzel, but reaction with soda in the product or with carbon dioxide in the oven produces sodium carbonate in the baking operation.

If ammonium carbonate were used as an ingredient of some baked goods, it would be safe to say that it would break down, before or during baking, into ammonia, carbon dioxide and water. All of these substances are volatile gases at baking temperature and presumably none of them would remain in the finished product. Therefore, ammonium carbonate probably would not have to be listed as an ingredient.

The ingredient statement on mincemeat need not include water if all added water is removed during the course of manufacture. When onions and celery have been used to flavor a product, but have been removed before finishing it, only "flavoring" need be listed as an ingredient. Label declaration of salt or citric acid is not required if crabmeat is thoroughly drained after dipping in acidified brine and then "dry packed."

In general, this one sums up the residue problem nicely: "Chemicals" may be used in foods if they are not harmful to the consumer, if they do not conceal any inferiority in the food and if any deviation from standard or expected identify of the food occasioned by their use be adequately declared on the label.

Particular importance should be placed on that word "expected." The average consumer is assumed to have zero knowledge of food technology. The Food and Drug Administration has the feeling that "what he does not know *may* hurt him" and wants to protect the consumer by complete listing of ingredients used in preparation of the product in question.

If no trace of a fumigant remains in a finished food it need not be labeled "fumigated." The manufacturer may, if he wishes, advertise the fact that the food has been fumigated. On the other hand, "the use of a highly toxic fumigant such as methyl bromide is viewed with apprehension."

Baked goods which are colored yellow by the use of pumpkin would be considered adulterated because of the simulation of egg content. Incidentally, this practice has been declared not correctable by any form of labeling. The difficulty apparently is thought to be that the consumer would see the color of the product and at once think "eggs," without reading the list of ingredients. Maybe the Food and Drug Administration doesn't have enough faith that the consumer will read the list of ingredients!

Particular ingredients in bakery products may be labeled simply "shortening," "leavening," "yeast nutrient" or "dough conditioner" unless such practice is found to result in denying the consumer the information which the law guarantees. This is, of course, an exception to the earlier generalization that each ingredient must be specifically listed. Even though the shortening manufacturer may be required to label his product "hardened vegetable oil" or "peanut and soybean oils and hardened cottonseed oil" or some such name, the baker need only describe it as "shortening" when listing the ingredients of his biscuits and crackers.

Shortenings, like all other foods, should, however, be properly labeled by their manufacturer. And the baker-user should carefully read the label. Any non-fat ingredient of the shortening should also be declared by the baker as an ingredient of the food in which that shortening has been used. For example, as stated before, lecithin is considered not a normal shortening ingredient.

This raises a question which is often

heard in food manufacturing plants. There appears to be in some cases reluctance to try some new ingredient in a commodity which has long been made by a "traditional" process. Perhaps it is recognized that use of some ingredient never before thought of in connection with this commodity would give a greatly improved product. Calcium chloride in canned tomatoes probably seemed revolutionary when first suggested. But a label should not be allowed to stand in the way of technical progress. If a new ingredient will give a vastly improved product and if it is perfectly wholesome or harmless, it should be used and included in the label listing of ingredients. The few consumers who do read the label won't give it a second thought, particularly if they find a better product. They will keep on buying it regardless of that strange ingredient!

## Industry Second In Horsepower

In aggregate horsepower, the food industry ranks second among all industries in America, having, in 1939, 5,641,424 hp. The industry ranks next to iron and steel and their products (excepting machinery), which had an aggregate horsepower of 12,625,676. The aggregate horsepower for all industries was 51,154,523. This is according to figures from the Census of Manufacturers, as tabulated in *Electrical World*.

Other data on the horsepower in the food industries in 1939 follow: Prime movers, 1,985,395 hp. Electric motors driven by purchased energy—number, 610,645; horsepower, 3,656,029. Electric motors driven by plant energy—number, 122,115; horsepower, 996,127. Electric generators, 720,413 kw. Electric energy—generated, 1,469,504,000 kw.hr.; sold, 79,809,000 kw.hr.; purchased, 4,993,209,000 kw.hr.

# Truck Panel Layout Promotes Products

**Standard Brands adopts distinctive painting and lettering, with a decalcomania of its products. Two-tone design represents dominant colors in company's packages.**

STANDARD BRANDS, INC., New York, has modernized the painting and lettering layout of its fleet of over 2,000 motor trucks. The company has changed from a basic color of dark green to a two-tone paint job of red and cream, and it shows its entire line of six food products on each truck, instead of only one product, as before.

The new truck layout was designed by Standard Brands to stand out sharply from the general run of commercial vehicles and to do a better advertising job for Standard Brands and all of its products.

Dark green, because of its popularity for commercial vehicles, has become a standard color with truck manufacturers, and it was felt that dark green Standard Brands trucks had nothing to distinguish them from thousands of similar vehicles. Therefore, to lend distinction and make the new 1941 trucks stand out from all others, it was decided to employ as basic paint colors the two most eye-compelling colors used on Standard Brands products—red and cream.

These two colors make a bright, pleasing combination. And together with black front and rear fenders and runningboards, they result in a vehicle of striking appearance and one of low paint maintenance expense insofar as the cost of fender touchups and repairs are concerned.

It happens that the use of cream as one of the two paint colors selected for the top of the engine hood and the upper portion of the body above the panel belt molding is also in keeping with the trend to use light instead of dark colors on trucks handling food products.

With the old letttering layout using dark green as the basic color, each

**Standard Brands new modernistic, two-tone truck painting layout, using cream color above the panel belt molding and red below, with black fenders. The side display is a decalcomania showing the Standard Brands line, with packages shown in natural colors.**

One of the new Standard Brands Chevrolets with the new painting and lettering layout. Thomas L. Smith, left, president of Standard Brands, Inc., talks with a salesman as he inspects the new delivery truck.

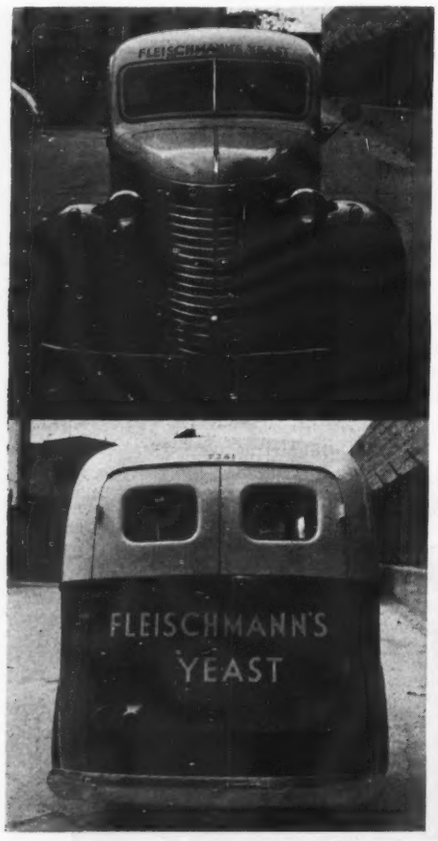
truck advertised only one of the Standard Brands products. As a result, the people in some towns, seeing the same truck for years, were under the impression that Standard Brands had only one product to sell.

To overcome this objection, it was decided to show on each truck the entire Standard Brands line. This includes Chase & Sanborn coffee, Tender Leaf tea, Royal baking powder, Royal gelatine, Royal puddings and Fleischmann's yeast.

To get the full names of all of the above products on each truck without an excessive amount of small lettering, which could not be read easily by pedestrians while the truck is in motion, a line-up of Standard Brands packages was prepared showing each product in its own distinctive package and with each package in true proportion to the other packages of the line. A reproduction of the package line-up is shown in one of the accompanying illustrations.

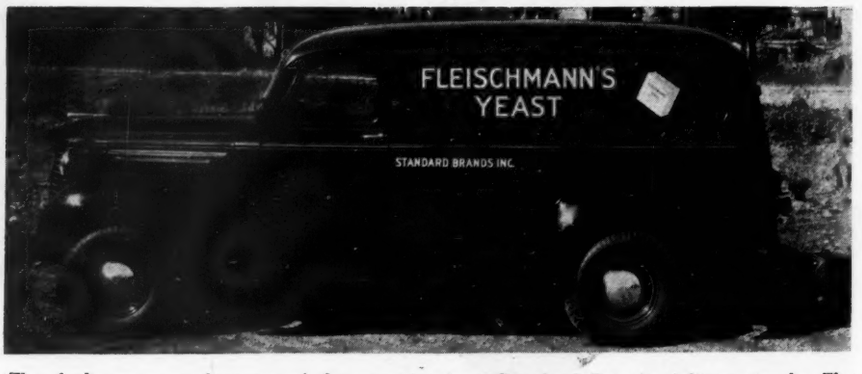
To get this package line-up on the truck body, it was made into a decalcomania which is applied to each side panel of the trucks, as shown in one of the accompanying illustrations. This, then, is the major tie-up between the design of the new Standard Brands trucks and all of the company's well-known products.

In addition to the above decalcomania, the Standard Brands name is shown in lettering on each side of the truck in fairly large letters, below the belt molding, with the red-painted portion of the truck body as a background. And the words "Fleischmann's Yeast" are painted on both the front and rear of the body. This further ties in with the former green-painted trucks carrying only the Fleischmann's Yeast lettering.




Front and rear views of the new modernistic truck layout. The idea of featuring one item, Fleischmann's yeast, on the previous layout has been carried over into the new by lettering on the front and the rear of the body.

Close-up of the side panel decalcomania on the new two-tone truck, showing each item in the Standard Brands line, in actual colors.




The dark green predecessor of the new two-tone Standard Brands delivery truck. The lettering features only one item in the Standard Brands line instead of all of them as in the newer layout.

# NEW PACKAGES & PRODUCTS

## Instant Juice Crystals

Dehydrated citrus fruit crystals for instant juice have been developed by General Fruit Products Co., Point Pleasant, N. J., for use in making plain or mixed drinks, sauces, sherbets, pies and pastry. "Cramore's Crystals," dehydrated fruit bases with component fruit oils and acids blended in, are available in orange, lemon or lime flavors. Latest addition to the line is "Gilhooley Crystals," trade name for a blend of orange, lemon and lime flavors with citric acid, corn sugar, mint and fruit oils.

The products first came on the market in 1937 with the introduction of "Lem-in Crystals." Since then, General Fruit Products has added a line of several flavors. The company also manufactures special vitamin-rich orange and lemon crystals for use in medical and health institutions. Cramore's Crystals are packaged in 1¼-, 2½- and 10-oz. glass containers, or in 4- and 8-lb. containers for restaurants and the bakery trade.

## Cookies Go To Camp

A clever innovation in the cookie field is "Rookie Cookies," baked by Burry Biscuit Corp., Elizabeth, N. J. Attractively packaged in a 5-lb. cardboard box shaped like a suitcase, with strong integral die-cut handles, Rookie Cookies are being carried home for family consumption as well as for gifts for the boys at camp.

Contents of the carton are divided into two sections, each in transparent wrap, one containing sweet cakes and cookies, and the other, crackers and salted biscuits. The new assortment includes many of Burry Biscuit's best known products.

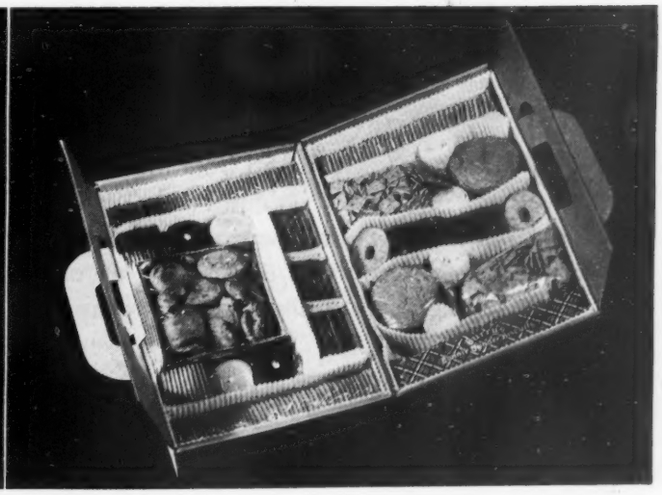
## Yeasted Peanut Butter

"Duff's Yeasted Peanut Butter," produced by P. Duff & Sons, Inc., Pittsburgh, in collaboration with Anheuser-Busch, Inc., is being tested as an Army food, particularly for use in the diets of new selectees who might be undernourished.

The nutritive, reinforced product is a combination of 80 percent Duff's selected peanut butter with 20 percent of pure, pasteurized, nonfermenting brewer's yeast.

The food product is made from the same yeast and by the same process as the "yeasted" peanut butter that was clinically tested at the Hillman Hospital in Birmingham, Ala., last year. No chemicals or synthetic vitamins are used in manufacturing the product, which contains vitamin $B_1$, vitamin $B_2$, and vitamin $B_6$, as well as pantothenic acid and nicotinic acid.

At Hillman Hospital last year, Dr. William deKleine, director of the medical division of American Red Cross, with representatives of Anheuser-Busch, supervised experiments with a mixture of peanut butter and yeast. According to *The Southern Medical Journal*, February, 1941: "Two ounces or more of this mixture a day, used as a supplement to the diet, gradually improves the health of the person with subclinical symptoms of deficiency diseases due to suboptimal intake of vitamin B complex and retards or prevents recurrences of these diseases."



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# Study of Dried Foods Expanded for Emergency

## USDA initiates new research and semi-works development to speed supplies for Army

COMMERCIAL dehydration of vegetables, and perhaps fruits, for emergency use at remote stations and in special field activities of the Army may be speeded by a new program initiated in July by the U. S. Department of Agriculture. A special research committee has been named to push experimental work at the Western Regional Laboratory of the Bureau of Agricultural Chemistry and Engineering. This committee includes three experienced research men, under the chairmanship of Dr. E. M. Chace, who has long been engaged in the Los Angeles studies of the Department. The other members of the committee are H. W. von Loesecke, of the Winterhaven (Florida) station, and W. B. Van Arsdel, who is the principal chemical engineer of the Western Regional Research Laboratory. The experimental work will be at this Berkeley (Albany), Calif., station.

Certain semi-works-scale studies will be undertaken promptly, not only to determine the quality of the product made, but also to give a basis for an engineering estimate of prospective cost. Most wanted by the Army are dried sliced onions, potatoes, carrots, and other root vegetables. The desire is to get these materials in a form that will keep more or less indefinitely without refrigeration. Reduction of bulk during drying also reduces the cost of transportation. If large-scale successful manufacture is achieved, this may help in feeding certain British civilians who cannot now be so well supplied because of the limited shipping space available for food movement.

The experiments will include studies of the chemical composition, vitamin content and flavor value of the dried material. It is desired that this material refreshen quickly when immersed in water shortly before use. To be ideal, the resulting refreshened slices should be almost exactly like the natural fresh material.

The Army is anxious to get this material for experimental use on limited field maneuvers. If it serves satisfactorily under those conditions, and the cost is within reason, stocks may be built up for certain remote bases or even reserve stocks for issue in emergency to troops sent into the field service where fresh vegetable supply would be difficult.

# Further Cut Asked In Tin for Cans

## Less tin must be used for food containers to meet goal set as defense objective by OPM

DURING July it became evident that OPM officials plan a new policy of curtailing the use of tin for food containers. Progress made thus far has been very encouraging. But "all-out substitution" has not yet been achieved. And it must be achieved if three-fourths of the tin ordinarily used in the United States is to be replaced by other materials. That is the present objective of the program.

Among the methods of economy newly emphasized by OPM statements, the following two are of greatest importance.

"Expand the use of glass containers where feasible, with beer and "Class 1" food products as examples. (The committee said this 'class 1' type of products includes baby food, sauerkraut, cherries and a few other acid fruits.)"

"Progressively decrease the total amount of tin allotted to the can-making industry, thus forcing, but giving time for, an orderly development in the substitution of thin electrolytic tin plate and of black (untinned steel) plate for cans. (The can-making industry has already reduced the tin coating on many kinds of cans by 10 percent, at the request of the OPM, and has voluntarily adopted terne plate cans for most paints, oils and some other products.)"

In effect, the second quoted paragraph means that the tin-can manufacturer will become the primary agent to determine who gets cans in the future. If the customers are not satisfied with the can makers' decisions (and it is certain that many will not be), then government priority agencies must step in to make final rulings. But it is important for food-plant users of tin containers to know that two alternatives are offered. The can maker may produce a limited number of containers of usual quality, or he may spread the limited quantity of tin over a larger number of containers than it would ordinarily serve.

Many food plant users of solder will be very much interested in another proposal of OPM. It is that a silver solder be substituted for a high-tin solder. For such purpose 40 to 50 lb. of tin may be replaced by 2.5 to 5 lb. of silver without important change in the cost of the resulting solder. Where the silver solders will serve in food containers, effort should be made promptly to develop plant technic for this kind of replacement.

Encroachment of salt water from San Francisco Bay threatened the irrigation system in the great Central Valley of California, source of out-of-season vegetables for the whole country. So the Bureau of Reclamation is taking a hand. From Shasta Dam on the Sacramento River fresh water will be supplied to flush out the irrigation channels and keep the salt in the sea where it belongs. The picture shows a worker in an asparagus field in the Valley.

# Hearing on Bread Starts; Will Last into August

## White bread, shortening and sweeteners are discussed. Enrichment coming up August 11

THE HEARING to fix standards for bread and rolls or buns began on July 7 and is continuing well into August. F&DA adopted a slightly different policy in these proceedings. It did not attempt to submit a complete standard for all ingredients for bread. Proponents of minor and special ingredients were, therefore, specifically asked to justify the inclusion of such components by making an adequate record for them.

The general presentation of the tentative standards published in June was first made by government witnesses. Then the various ingredient representatives presented their testimony and were subjected to cross-examination by the government and by others who questioned the appropriateness of proposals. After the suppliers of materials have completed their cases, the baking industry will present its evidence. General rebuttal by the government will follow, rather than taking up the ingredients one at a time.

White bread was the subject of discussion for the opening week of the hearing. Many of the optional ingredients in white bread will, of course, be used also in the other types of bread. Further testimony on those ingredients common to all types of bread will probably not be necessary after the section on white bread is completed.

Shortenings were discussed for about two days. The outstanding feature of this phase of the hearing was the request by the Procter & Gamble Co. They requested inclusion of mono- and diglycerides as permissible ingredients of shortening used in bread products. It was brought out by technical witnesses that many of the shortenings now on the market, and used by bakers, may already contain as much as 10 percent of these natural fat derivatives.

Sweetening agents also occupied about two days. Major controversy was over the inclusion of molasses as a permissible ingredient in white bread. The government argued that the color contributed by molasses would be misleading to the consumer. Manufacturers of molasses pointed out that refiners' sirup and malt sirup of color just as dark as molasses were already permissible sweetening agents. In addition, molasses was said to contain desirable minerals and yeast nutrients.

Enriched bread will not be discussed until at least August 11. This date was set by the presiding officer as the earliest date by which it would be reached, in response to a request made by Dr. Russell Wilder supported by the Bakers' Association. Experimental tests were said to be under way at this time to determine the degree of destruction of thiamin in the baking of a loaf of enriched bread. Preliminary comments indicate that the destruction is slight under normal baking conditions. The request was made that enriched bread not be considered until after all other types of bread had been taken up. This was to permit time to assemble and correlate the facts as determined in the tests just being completed.

Extended discussion is anticipated in the sections on milk bread and honey bread. It is possible that some further postponement from August 11 may be necessary, but at the date of writing (July 21) August 11 was the best guess possible.

## Processing of Peanuts To Be Expanded Soon

A LARGE SURPLUS of peanuts is sure this year. As a result, much new peanut processing for both oil and flour is being encouraged by aggressive effort of government officials.

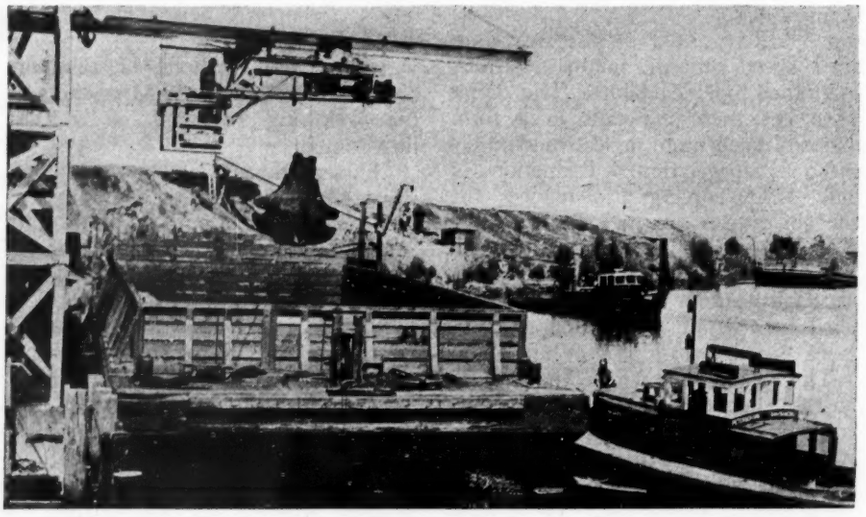
Impending shortage of all kinds of animal and vegetable oils may be slightly alleviated by this increased supply of peanut oil. Many crushers of cottonseed and soybeans are being asked to consider peanut crushing. Thus, the oil when made will already be in the normal commercial channels of food oil distribution.

To give the maximum credit from the peanut meal, aggressive work is being done by SMA on new methods for peanut-flour manufacture. It is hoped that substantial quantities of meal can thus be promoted to high value markets instead of going into feed and fertilizer usage. The effort includes even recommendations that the proposed bread standards being formulated by F&DA shall permit peanut flour as a component. The making of specialty breads including peanut flour is also sought.

## Navy Submits Food List

AMOUNTS of various foods which the Navy Department estimates will be required to feed the Navy's enlisted men for the fiscal year beginning July 1, have been announced. The list follows:

| | | |
|---|---|---|
| Bread and flour | 86,119,800 | lb. |
| Preserved meats | 10,389,600 | lb. |
| Smoked meats | 22,230,000 | lb. |
| Fresh meats | 98,798,700 | lb. |
| Dried vegetables | 12,480,000 | lb. |
| Canned vegetables | 43,439,000 | lb. |
| Fresh vegetables | 192,874,500 | lb. |
| Dried fruits | 2,012,400 | lb. |
| Canned fruits | 18,525,000 | lb. |
| Preserved fruits | 9,473,100 | lb. |
| Fresh fruits | 56,628,000 | lb. |
| Beverages | 13,462,800 | lb. |
| Milk | 21,001,500 | lb. |
| Butter | 9,360,000 | lb. |
| Cereals | 14,820,000 | lb. |
| Cheese | 1,883,700 | lb. |
| Eggs | 12,168,000 | doz. |
| Vegetable shortening | 11,232,000 | lb. |
| Oils, sauces and vinegar | 1,419,600 | gal. |
| Sugar | 38,844,000 | lb. |
| Yeast | 1,365,000 | lb. |
| Miscellaneous: (Flavor, spices, salt, etc.) | 13,884,000 | lb. |



**Modern electrically operated clamshell-bucket hoist used to speed up the unloading of sugar beets from a 40-ton barge on the San Joaquin River in California. Speed is important in transferring the beets from the fields to the refining plant, as beets left in the sun from one to three days after harvest decrease in value from $10 to $21 an acre. This picture was taken at a refinery near Tracy, Calif.**

# Labor Priorities Believed Certain

**Man power may even be shifted among industries. Some food lines expected to suffer**

PRIORITY on manpower, even by commandeering from one plant to use in another, is certain to develop before long. There has been no official announcement of this. But unofficially important government executives admit the plan.

Certain food industries are likely to benefit; others are likely to be seriously hurt by this program. Any firm that has difficulty in getting labor for food manufacturing desired by the government will be aided. Other food manufacturers, for example those making novelties or specialties regarded as unnecessary, may have their labor taken away from them.

Attempts to check this plan in Washington at this time generally lead to official denials that anything so drastic is contemplated. But positive evidence is available that extreme measures are being studied for application this fall. Intermediate steps will come first, but ultimately the government will see to it that those plants which it wishes to have run at full capacity are adequately staffed for as many shifts per week as are desired. Where necessary to take the needed labor away from some other manufacturer, there will not be much hesitancy in taking even that drastic action.

The operating unit that is laying down the long-range program is the new all-government labor-supply committee, headed by Commissioner Arthur S. Flemming, of the Civil Service Commission. The President has told Commissioner Flemming and his committee to do this job.

# National Dairy Will Sell Frozen Food Line

SOMETHING that many connected with the frozen food industry have long anticipated is about to come to pass. That is the entry in a major way of a large dairy company into the quick frozen food field. In September, National Dairy Products Corp., with headquarters in New York, will bring out a complete line of quick frozen fruits and vegetables under its own labels. It may also handle some frozen poultry, with the possibility of adding meat and fish later. National Dairy will serve both the retail and institutional markets.

Branches in the Middle West and Northeast will start the ball rolling, the plan being to let the subsidiaries make their own decisions as to whether they will handle the line. National Dairy will not do the freezing, but will buy from companies now in the business.

This is not an entirely new venture for National Dairy, for some of its companies, such as Southern Dairy, have handled various brands of frozen foods for some time. But judging from present plans, it may become an important factor in the industry.

Because of the extensive facilities of the dairy company for refrigerated storage and distribution, and because of the quality control set-up afforded by the Sealtest Laboratories of National Dairy, the costs and problems of selling frozen foods should be somewhat reduced.

**Electricity for the entire Lobster Aquarium of Brooks & Sprague, Inc., at Lynn, Mass., is supplied by this diesel-electric set. The plant ships about 1,500,000 lb. of live lobster annually, plus 500,000 lb. of other seafood.**

# OPACS Assures Cans For 1941 Food Crop

BY ORDER OF OPACS on July 26, sufficient materials and supplies shall be allocated to manufacturers of cans for the production of the cans necessary to pack the current food crop.

OPACS rules, however, that this preference program shall not be used to accumulate excessive inventories, and it requires rigid economy in the use of critical materials in the manufacture of cans. The program applies only to cans for the 1941 crop.

# Pickle Sales Up; Shortage Feared

**Packers report rising demand but see shortage of labor at harvest and small 1942 crop**

CONSUMPTION of pickles for the first five months of this year topped that for last year by more than 100,000 bu. a month. And salt-stock consumption has increased 70 percent in the last four years. These trends were reported at the mid-year meeting of National Pickle Packers Association in Chicago on June 25.

The carryover of salt stocks as of June 1 was given as: No. 1 grade, 364,094 bu.; No. 2, 234,060; No. 3, 188,604; broken and hollow, 66,837; and unclassified, 138,499; or a total of 992,132 bu., as compared with 1,390,178 bu. at the same date a year ago.

Indicated acreage for the entire country is 91,231, the acreage actually planted being about the same as last year. Crop prospects are considered about normal. There is fear, however, that a shortage of rural labor will curtail operations during the harvesting season.

While the trend in pickle demand is definitely upward, it is feared that next year sufficient acreage cannot be obtained to produce enough pickles to meet the demand. In addition to the growing labor shortage, farmers are reported to be shying away from pickle contracts in large numbers.

Another element of industry worry is the growing scarcity of skilled chemists, who are said to be deserting the industry for more profitable berths in defense industries and the armed forces.

A warning against unnecessary new plant expansion in anticipation of long-range better business was delivered by F. Olney Brown, president of the association. He believes there is plenty of plant capacity to handle the new demand. Mr. Brown also predicted a big demand for pickles this fall, with prices reaching $3 to $3.50 a bu., but warned that this year's prices will be used by the farmer as a yardstick for next year's crop.

Unanimous support was accorded by members of the association to a suggestion for raising a $25,000 publicity fund by assessment. And although Michigan State College has not yet released the vitamin research report of Dr. Fred W. Fabian, the feeling was that this would not hinder the plans for a nation-wide publicity program centered around the development of a booklet explaining the value of the pickle.

» » » » » So You Think *YOU* Have a Problem?

This New York pooch has grand-kittens to feed . . . so what are you worrying about?

The chances are that Kemp equipment for roasting, toasting, baking, high-temperature cooking or can-making can help you. But even Kemp can't help poor Tiny* with her food problem.

Higher taxes in the food industry must be paid out of new operating economies, in short, *more efficient processing.* And heat processing is the Kemp specialty, for Kemp equipment saves 15 to 40 percent (or more) in fuel alone; insures uniformity of product and cuts spoilage through automatic control, not merely of temperatures, but of flame characteristics and flame pressure; saves time through faster heat liberation.

It's time now to look into these possibilities . . . *before* those tax bills come around.

Address **The C. M. Kemp Mfg. Company, 405 East Oliver Street, Baltimore, Maryland.**

* *Tiny lost her only pup five years ago, raised two newborn kittens instead. One of them, a mother herself, brings the grand children back to Momma Tiny to feed . . . which she is doing, according to the New York World Telegram through whose kindness we reproduce the photo above.*

**KEMP of BALTIMORE**

## Findings of Survey On Labels Published

RESULTS of the nation-wide survey on the subject of canned foods and their labels have been published by National Canners Association, Washington, D. C. The findings made by Elmo Roper, who conducted the survey, are not startling in any respect. They do, however, contain much of interest to canners and other food processors. The complete findings were copyrighted and issued under the title, "A Study of Certain Attitudes of Women Toward Canned Fruits and Vegetables."

## Dairy Council Members Include 16 Republics

MEMBERSHIP on the Council of Sponsors, Inter-American Committee for the Dairy Industries, now includes the ministers of agriculture of 16 American nations. Formed to coordinate Inter-American activities in the dairy field, the committee plans to stimulate the production of milk and dairy products in the Western Hemisphere to improve public health and to replace the surplus beef and grain which depend upon export markets now cut off by war.

Members of the Council sponsoring this long range program are Secretary Claude R. Wickard, representing the United States ,and the ministers of Argentina, Bolivia, Brazil, Chile, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Mexico, Nicaragua, Panama, Paraguay, Peru and Venezuela.

## Bottles Standardized

VARIETIES of returnable glass beer containers are limited by 22 under a standardization program adopted by the United States Brewers Association and the Glass Container Association. At present, brewers are using almost 100 different sizes and shapes of bottles.

## SCHEDULE OF EVENTS

**AUGUST**

4– 7—Vegetable Growers Association of America, Inc., thirty-third annual convention, Deshler-Wallick Hotel, Columbus, Ohio.
18–30—Short Courses in Dairying, Department of Dairy Industry, College of Agriculture, University of Connecticut, Storrs, Conn.
20–23—National Food Distributors Association, Sherman Hotel, Chicago.
28—American Cranberry Growers Association, Pemberton, N. J.

**SEPTEMBER**

4– 6—New England Association of Ice Cream Manufacturers, Poland Spring House, Poland Spring, Me.
4– 6—Northern Nut Growers Association, Hershey, Pa.
8—Course in Baking and Milling Technology, Siebel Institute, Chicago.

# Food Machinery Materials Get Priority Preference

## Order affects materials for canning machinery and all food equipment repairs

DRASTIC STEPS were taken in July by OPACS to insure adequate supply of materials for the maximum amount of canning equipment needed to process the current pack of fruits and vegetables and to take care of maintenance on all food processing and storage equipment.

Two actions were taken by OPACS. The first provides emergency allocation of raw materials and equipment for construction and repair of canning machinery needed for this year's operations. Equipment orders placed prior to June 25 for delivery to the end of August get a blanket priority of A-2 through this action.

The second action provides continuous preferential treatment for all orders for repair and maintenance materials and equipment required for uninterrupted operation of all types of food processing and storage. General repair and maintenance orders under this action are to get an A-10 rating, while emergency "breakdown" repair requirements will have an A-1-a classification, the highest available.

Canners whose machinery orders are involved in the first ruling are not required to take any steps to insure deliveries under this system. The Priorities Division has sent notice of the A-2 rating directly to manufacturers, giving them authority to requisition needed supplies. In putting into effect OPACS' directive, OPM told the manufacturers not to use aluminum wherever substitution could be made, regardless of purchasers' specifications. Straight chromium steel also is to be preferred over nickel-bearing steel.

OPACS' action to assure uninterrupted operation of essential industries is applied to 25 fields in addition to food processing and storage, including electric power, transportation, chemicals and similar activities.

## U. S. Troops in Arctic Get Vitamin Tablets

DAILY RATION for a soldier serving in the northern troops of the U. S. Army now includes two multiple-vitamin tablets, authorized by the Surgeon General's office as protection against nutritional diseases. The capsules, which contain vitamins A, $B_1$, $B_2$, C and D, as well as nicotinic acid compound, have been issued as a safeguard against vitamin deficiency in a soldier's diet in the Arctic regions where fresh meats, vegetables and dairy products are not readily available.

## Public Urged To Grow And To Process Foods

"THE DEMAND for canned foods will be greater than last year because of increased consumer buying power, Army food purchases and food shipments under the lend-lease program. Noncommercial food storage and preservation will help meet consumer needs by supplementing commercial supplies and contributing to price stability."

On the basis of that conclusion, community campaigns throughout the nation to develop full use, canning, drying and storage of foods have been launched jointly by Harriet Elliott, associate administrator of OPACS, Paul McNutt and Secretary Wickard. The paramount purpose is to save quantities of food which ordinarily would go to waste, but also involved is promotion of community gardens, noncommercial processing, and the like.

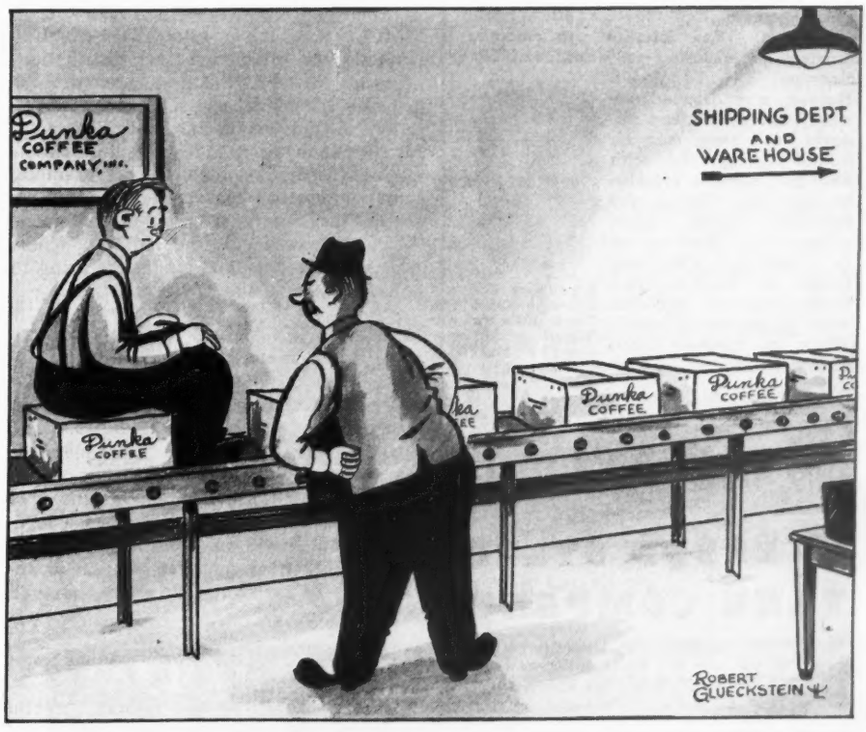
Leaders in community programs are asked to take these steps: Take stock of local fruit and vegetable surpluses and the time they may become available; plan for distribution of surpluses in fresh or preserved form through such methods as school lunches, community kitchens, etc.; make arrangements for collecting, storing, drying or otherwise preserving products not to be used in fresh corn. Government agencies of the Department of Agriculture, Federal Security Agency and WPA are cooperating in the effort, the latter by promoting WPA gardening and canning projects.

The Department's Extension service plans to enlarge its "live at home" program which encourages the raising and preserving of home food supplies.

## What's Doing in Regard To Food Standards

DURING the past month action on new Federal food standards has not been very great. The bread standards hearing has been in session since July 7. (A separate story on this hearing will be found in these columns.) The tentative order on dietary foods was issued in the *Federal Register* of July 8, as described below. Still momentarily expected were tentative orders on canned fruits and canned fruit cocktail, to end the suspense in the sugar controversy.

The proposed regulations on dietary foods included consideration of the fol-

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*Hackney Removable Head Welded Type Drum with I-Bar Hoops—and Toggle-tite closure.*

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In Hackney Barrels and Drums, seams, cracks and crevices have been eliminated. The interiors are smooth, flawless . . . assuring easy and complete cleaning. The Toggle-tite closure, when locked, securely holds the head airtight. The head may be completely removed, with ease and speed. Because of the I-bar Hoops, the container gains extra strength. An agitator can be installed in Hackney Drums or Barrels—effectively agitates contents, even to bottom of chime. Write for complete information today.

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lowing features: Label statements relating to vitamins, minerals, infant food, certain food used in control of body weight or a dietary arrangement with respect to disease, non-nutritive constituents, and hypoallergenic food. Interested parties had until July 28 to file objections to the proposed order.

For the purposes of the regulations, there are suggested minimum daily requirements of vitamins A, $B_1$ (thiamin), C (ascorbic acid), D and G ($B_2$, or riboflavin). Minimum daily requirements are also proposed for calcium, phosphorus, iron and iodine—for infants, for children and for adults, the dividing lines being 12 months and 12 years, respectively.

# CAPITAL VIEWS

**BACK TO COAL**—Many food plants in the northeastern states are going to be asked to return to the burning of coal this winter. And shortage of fuel oil, as well as shortage of gasoline, will make this imperative for much of the Middle Atlantic and New England area. But such return need not be permanent, because when new pipe-line and tanker transport are fully established, there will be plenty of petroleum supplied in these areas. Engineers and executives must make quick adjustments now, but can safely assume that these are likely to be temporary—not even for the full duration of the Emergency.

**HEMISPHERE SHARING**—North and South America are sharing surplus troubles on wheat. An international gathering has been discussing this in Washington during July. Threatened shortages of certain manufactured foods in Latin America means that limited United States supplies also may have to be shared. This load on American food processors will not be as heavy as that involved in aiding Britain, but may become serious on certain individual commodities which are normally purchased in Europe by the Latins.

**SIMPLIFICATION FOR DEFENSE**—Economy in production and distribution, necessary to save manpower as well as materials, demands new programs reducing variety in both goods and goods packaging. Already some other industries are well on the way with this program. For example, paint and varnish makers are not only reducing the variety in sizes of containers, they are also reducing the variety of colors available. Certain food groups are going to be asked to take similar action.

**FOOD TAXES**—Several types of food are going to be taxed heavily in the new defense levies. The House of Representatives seems certainly planning new taxes on candy, chewing gum and soft drinks. The theory appears to be that such materials are not essential foods and that they can bear taxes with least burden on the low-income classes. When imposed, such taxes will include levies on stocks at all stages of distribution. Hence, stocking up in anticipation of tax is not necessary, nor will it be effective.

**USE PEANUT OIL**—Food manufacturers using vegetable oils are being urged by Washington to consider peanut oil for partial or total replacement of their normal supplies. Many manufacturers can probably do this with the development of new formulas that may add an attractive feature to their line of goods. For example, some people think that French dressing made with peanut oil will find much favor with the American housewife. It may become necessary to make many such substitutions as the shortage of food oils becomes more acute next year.

**SPEED UP CANNING**—Every opportunity is taken officially to encourage both commercial canning and home canning of foods this year. The special priority given to manufacturers of canning machinery for the procuring of metals and accessory equipment is only one evidence that both OPM and OPACS feel that there cannot possibly be any surplus this year of any canned fruit or vegetables. Home canning to avoid waste of temporary surpluses of fruits and vegetables is being urged particularly by the Consumer's Division of OPACS.

**SHIP SHORTAGE**—Any food firm that depends on water transportation for raw materials or finished products should promptly plan for substitute means of goods movement. The British are constantly demanding more tankers and more cargo ships. A negligible number will remain in coastwise service after August, and in some cases shortage of railway equipment is an inevitable secondary consequence.

**POLICY OF ABUNDANCE**—It is now frankly admitted in Washington that the earlier New Deal policy of curtailed agricultural production has been abandoned. The policy of abundance of agricultural materials is now accepted. In boosting this program on almost everything but wheat and cotton, Secretary Wickard is looking forward to the time when America will have to take over the job of feeding most of Europe, which will have exhausted most of its food resources completely within another year.

**MILK PRICE QUARRELS**—OPACS and Agriculture Department officials take conflicting stands regarding proper prices for milk to farmers. The OPACS protest to Secretary Wickard against increasing cost at primary points is mild, but is intended to lay the foundation for later action on behalf of consumers if those who dump milk succeed in getting much higher prices at the farm. The milk-processing industry, which is caught between two official fires, is the one that is going to suffer most in some areas.

# CONSTRUCTION NEWS

| | Pending (thousands) | Awarded July (thousands) | Total Awarded 1941 (thousands) |
|---|---|---|---|
| Bakery | $40 | $150 | $3,682 |
| Beverages | 100 | 730 | 5,819 |
| Canning and Preserving | 100 | ..... | 428 |
| Cold Storage Plants | ..... | ..... | 635 |
| Confectionery | ..... | 100 | 185 |
| Grain Mill Products | 315 | 240 | 4,910 |
| Ice Manufactured | ..... | ..... | 180 |
| Meats and Meat Products | 200 | 50 | 987 |
| Milk Products | 80 | 80 | 1,631 |
| Miscellaneous | 405 | 100 | 3,252 |
| | $1,240 | $1,450 | $21,709 |

## More Dairy Products To Be Made This Year

NUMBERS of milk cows and production of milk and milk products have been increasing in recent years, as shown by the accompanying table. That this trend continues in 1941 is evidenced by some of the figures now available.

For instance, evaporated milk production is running at record levels, about 28 percent above 1940 and 40 percent over the 1935-1939 average. Condensed milk output is also far above 1940 production. Cheese and butter production is also running at record levels.

Prospects are good for this high production rate of dairy products to continue throughout the year. Numbers of milk cows are still increasing, stimulated by export demand for milk products from Great Britain. Ample supplies of feed and relatively low feed prices indicate that milk production per cow will remain on high levels. And, finally, consumption of fluid milk and dairy products in the United States is steadily increasing, as indicated by May sales of fluid milk, reported as 8.9 percent greater than in May, 1940.

| Calendar year | Milk cows, Thousands | Dairy production: Total milk, Billions pounds | Creamery butter, Million pounds | All cheese, Million pounds | Evaporated milk, Million pounds |
|---|---|---|---|---|---|
| 1929 | 22,440 | 99.0 | 1,597 | 487 | 1,500 |
| 1930 | 23,032 | 100.2 | 1,598 | 500 | 1,449 |
| 1931 | 23,820 | 103.1 | 1,667 | 492 | 1,429 |
| 1932 | 24,896 | 103.9 | 1,694 | 484 | 1,571 |
| 1933 | 25,936 | 104.8 | 1,762 | 544 | 1,717 |
| 1934 | 26,931 | 101.5 | 1,695 | 579 | 1,712 |
| 1935 | 26,069 | 101.4 | 1,632 | 621 | 1,839 |
| 1936 | 25,439 | 103.2 | 1,629 | 643 | 2,044 |
| 1937 | 24,993 | 103.1 | 1,623 | 649 | 1,903 |
| 1938 | 24,834 | 107.3 | 1,786 | 725 | 2,104 |
| 1939 | 25,088 | 108.6 | 1,762 | 703 | 2,171 |
| 1940 | 25,397 | 111.1 | 1,809 | 770 | 2,476 |

## Fats and Oils Output Expected To Be High

TOTAL PRODUCTION of fats and oils from domestic materials in 1941 is expected to be larger than the previous

# Spotlighting the Product
## *by improving the Package*

One of the most effective ways of bringing a product out of the "background" and into the "spotlight" is to *improve its package.* A package improvement gets the attention of the trade. Retailers give the new package better display. Public interest is stimulated, and people buy more readily. At every point along the "selling front," the new, improved package gets a better break.

### *Many Ways of Improving a Package*

There are numerous ways in which this can be done. You may produce a package that keeps your product in better condition . . . the package may show the goods off to better advantage . . . it may afford greater convenience to the user . . . it may be wrapped in a more distinctive, eye-catching style.

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We, as well as other machine makers, are filling heavy demands for defense work. You will help your Nation, yourself and us by anticipating your own requirements for machines or service as far in advance as possible.

Due to the extreme versatility and high efficiency of our modern machines, an outstanding, individual package does not necessarily increase costs nor complicate production methods. In fact, many of our clients have found that package improvements are often accompanied by *substantial savings in both time and money.*

We will be glad to give you every assistance in developing a better package, *designed for sales.*

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If you're hemmed in from all sides . . . if you don't know where your next square inch of floor space is coming from—Viking may be able to help.

Simple and compact in design, Viking Rotary Pumps can be quickly and neatly installed in less space without crowding . . . there are no space-wasting features . . . no complicated piping or installation requirements. The space you save with a complete Viking installation can be profitably used for storage, extra work room, added machinery.

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record output of 1940, according to the Bureau of Agricultural Economics. Decreases in production of lard and greases is expected to be more than counterbalanced by increased production of butter, tallow and vegetable oils. Soybean oil output, in particular, is expected to increase.

In spite of earlier forecasts, the 1941 lard output is expected to be only some 5 percent smaller than 1940 production.

Importations of oils and oilseeds will undoubtedly be lower than in 1940 but, unless radical changes in the ocean transport situation occur, this reduction will not be as great as previously expected.

## Canned Food Needs Of Army Increased

REVISED ESTIMATES of Army and Navy requirements for canned fruits and vegetables from the 1941 pack were released during July by the procurement division of OPM. Figures indicate that the military will take an amount equal to 8.3 percent of the total 1940 pack of vegetables and 4.9 percent of the 1940 pack of canned fruits.

In sending the revised tables, based upon actual consumption by the enlarged Army and Navy, to all canners, OPM said invitations to bid for Army supplies would be sent out from the central purchasing offices in Chicago, San Francisco and New York during the packing period. Letters sent to all canners urged them to quote prices on deliveries to as many points as possible and reviewed steps that have been taken to simplify the industry's task of meeting government requirements. These include waiver of the Walsh-Healey Act on future contracts for most seasonal perishable items, waiver of bid bond and performance bond, inspection of carload lots before shipments, and waiver of trade labels.

The letter also said: "It is impossible for us to advise each canner individually how many cases of his pack he should reserve for the needs of the armed services. We do know, however, approximately how many cases of each item the Army and Navy plan to use from the 1941 pack. In consequence there is attached hereto a table showing those amounts, the 1940 pack of each item and the percentage, separately, of the Army's and the Navy's

### CANNED FRUITS
**Army and Navy requirements from 1941 pack.**

| Product | 1940 Pack Basis 24/2½'s Cases | Army Requirements from 1941 Pack Basis 24/2½'s Per Cent: Cases | Army: 1940 Pack | Navy Requirements from 1941 Pack Basis 24/2½'s Per Cent: Cases | Navy: 1940 Pack |
|---|---|---|---|---|---|
| Apples | 2,058,173 | 141,312 | 6.9 | 68,502 | 3.3 |
| Apple Sauce | 1,992,485 | ..... | ... | 53,010 | 2.7 |
| Apricots | 2,198,506 | 142,400 | 6.5 | 65,521 | 3.0 |
| Cherries | 3,307,260 | 53,360 | 1.6 | ..... | ... |
| Grapefruit | 2,843,248 | 73,433 | 2.6 | ..... | ... |
| Peaches | 11,329,009 | 354,200 | 3.1 | 118,487 | 1.0 |
| Pears | 5,521,912 | 141,312 | 2.6 | 74,514 | 1.3 |
| Pineapple | 10,998,956 | 498,400 | 4.5 | 68,967 | .6 |
| Prunes | 1,235,644 | 141,312 | 11.4 | 51,599 | 4.2 |
| Figs | 563,808 | ..... | .... | 53,317 | 9.5 |
| TOTAL | 42,049,001 | 1,545,729 | 3.7 | 553,917 | 1.3 |

NOTE: In the above table all figures are listed in cases of 24/2½'s in order that they may be comparable. Army and Navy purchases will however, be in the can sizes and of the grades listed below, the first named can size being preferred. Apples, Standard 2½'s or 10's; Apple Sauce, Fancy 10's; Apricots, Choice 10's or 2½'s; Cherries, Choice 10's or 2½'s; Grapefruit, Fancy 5's or 2's; Peaches, Choice 10's or 2½'s; Pears, Choice 10's or 2½'s; Pineapple, Fancy 2½'s; Prunes, Fancy 10's; Figs, Fancy 10's.

### CANNED VEGETABLES
**Army and Navy requirements from 1941 pack.**

| Product | 1940 Pack Basis 24/2's cases | Army Requirements from 1941 Pack Basis 24/2's Per Cent: Cases | Army: 1940 Pack | Navy Requirements from 1941 Pack Basis 24/2's Per Cent: Cases | Navy: 1940 Pack |
|---|---|---|---|---|---|
| Beans, Green and Wax | 9,803,603 | 618,450 | 6.3 | 228,638 | 2.3 |
| Beans, Lima | 1,991,508 | 257,355 | 12.9 | ..... | ... |
| Beets | 3,719,353 | 206,150 | 5.5 | 96,715 | 2.6 |
| Carrots | 1,435,299 | 206,150 | 14.4 | ..... | ... |
| Corn | 15,523,579 | 1,350,000 | 8.7 | 207,816 | 1.3 |
| Kraut | 5,736,520 | 446,600 | 7.8 | 109,198 | 1.9 |
| Peas | 25,195,640 | 1,436,400 | 5.7 | 270,949 | 1.1 |
| Pumpkin | 3,090,411 | 279,850 | 9.1 | 45,922 | 1.5 |
| Spinach | 4,962,143 | 414,960 | 8.4 | 142,301 | 2.9 |
| Sweet Potatoes | 306,968 | 279,850 | 91.2 | ..... | ... |
| Tomatoes | 29,598,984 | 1,786,400 | 6.0 | 467,204 | 1.6 |
| Tomato Juice | 15,179,055 | 820,610 | 5.4 | ..... | ... |
| Other | 3,108,562 | 204,820 | 6.6 | 119,140 | 3.8 |
| TOTAL | 119,651,625 | 8,307,595 | 6.9 | 1,687,883 | 1.4 |

NOTE: In the above table all figures are listed in cases of 24/2's in order that they may be comparable. Army and Navy purchases will however, be in the can sizes and of the grades listed below, the first named can size being preferred. Beans, Green and Wax, Extra Standard 10's or 2's; Beans, Lima, Extra Standard 10's or 2's; Beets, Fancy 10's or 2½'s; Carrots, Fancy 10's or 2½'s; Corn, Extra Standard 2's Kraut, Fancy 2½'s; Peas, Extra Standard 10's or 2's; Pumpkin, Fancy 2½'s Army, Fancy 10's Navy; Spinach, Fancy 10's or 2½'s; Sweet Potatoes, Fancy 2½'s; Tomatoes, Extra Standard 10's, 2½'s or 2's; Tomato Juice, Fancy 10's or 24 ounce; Other vegetables, Fancy 10's.

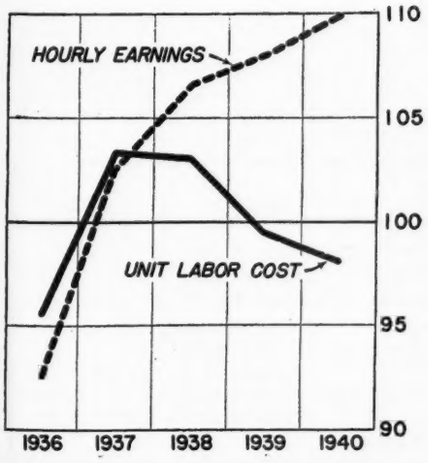
needs. By intelligent use of this table each canner can ascertain how many cases of an item he ought to assume as his share of the Army and Navy requirements. Of course, those who can offer more should do so, as some canners may not be able to offer extra standards."

The revised tables of canned vegetables and fruits requirements for Army and Navy are on page 68.

## Price Rise Continues

COMMODITIES PRICES continued to rise in the period from June 14 to July 12, with food commodity prices increasing faster than the general price level. The *New York Journal of Commerce's* weekly commodity price index, which stood at 91.5 in mid-June, advanced to 92.7 for the July date. The same publication's grain price index rose from 76.2 to 77.5 during the four-week period, while the food price index increased from 85.7 to 87.4.

Individual spot commodity prices showed some increases and some decreases during the period. Wheat, No. 2 dark winter, at 94c. on June 14 rose to 95½c. on July 12, while flour increased from $5.80 to $6.00 in the same four weeks. Corn, No. 3, yellow, at 73½c. on the earlier date was 73¾c. on July 12. Beef was steady at 16½., but lamb jumped from 18c. to 21c. and pork loins from 21c to 25c. Lard also increased from $10.15 to $10.60. Eggs upped from 25¾c. to 27¾c., and butter at 34½c. on the earlier date, rose to 35½c. Sugar decreased from $3.50 to $3.45, cocoa fell from $8.00 to $7.87, but coffee rose from 11⅞c to 12¼c. Canned peaches jumped from $1.35 to $1.80, canned tomatoes fell from 79c. to 76½c. and canned salmon increased from $2.75 to $2.85.




**Comparison of labor costs and hourly earnings in the food industries (average of 1935-1939 — 100). Prepared by the Bureau of Foreign and Domestic Commerce.**

# INDICATORS

*Flour production* in June, 1941, by mills accounting for 65 percent of United States production, according to *The Northwestern Miller* totaled 5,545,828 bbl., compared to 5,090,089 bbl. in June, 1940.

*Meat consumption*, per capita, in 1940 was 140.6 lb. compared to 131.7 lb. in 1939.

*Pig crop*, spring 1941, was estimated by Agricultural Marketing Service at 50,083,000, compared to 50,066,000 a year before.

*Red sour cherry crop* this year is estimated at only 79,150 tons, compared to 112,520 tons a year ago.

*Tomato acreage* for processing, according to revised estimates of the U.S.D.A., totals 466,790 acres, up 11 percent over 1940 plantings.

*Tuna fish pack* on the West Coast this year is estimated at 48 percent below last year's production.

*Cocoa bean* stocks in licensed U. S. warehouses reached an all-time high of 1,430,658 bags on July 15, 1941, compared to a previous high on June 13, 1939, of 1,429,642 bags.

*Butter, creamery*, produced in May, 1941, totaled 215,570,000 lb., a record, 11.9 percent over May, 1940, and 16 percent of the 1930-1939 May average.

*Cheese*, American, produced in May, 1940, totaled 76,665,000 lb., a record, and 16.7 percent above output in May, 1940.

*Swiss cheese output* in Wisconsin in 1940 was 32,304,000 lb., compared to 28,881,000 lb. in 1939 and comprised about two-thirds of all Swiss cheese produced in this country. Imports of Swiss cheese were 5,794,221 lb. in 1940.

*Egg production* in June, 1940, was over 4 billion and was the largest June output since 1930.

*Oleomargarine* sales in May, 1941, as indicated by sales of internal revenue stamps, totaled 24,975,238 lb., compared to 26,387,334 lb. in May, 1940.

*Oleomargarine* sales, first five months of 1941, totaled 155,671,822 lb., 11 percent above sales for the like period of the preceding year.

*Prunes*, dried, to be produced in California this year are estimated at 229,000 tons, compared to 175,000 tons in 1940 and to a ten-year average of 207,000 tons.

*Apricot* tonnage, fresh, in California this year is estimated at 232,000 tons, compared to 103,000 tons last year and to a ten-year average of 240,700 tons.

*Soybean* acreage this year is now reported at 9,990,000 acres, down from 10,528,000 acres in 1940.

*Walnut production* in California this year is estimated at 53,000 tons, compared to 42,200 tons in 1940 and to a ten-year average of 43,330 tons.

*Peach output* for 1941 is now placed at 67,049,000 bu., compared to 54,430,000 bu. last year.

*Fruits*, frozen, in storage on July 1, 1941, totaled 119,285,000 lb., compared to 120,893,000 lb. on July 1, 1940, and to a 1936-1940 average of 99,911,000 lb. for the date.

*Vegetables*, frozen, in storage on July 1, 1941, were 56,867,000 lb. compared to 52,688,000 lb. a year before.

*Butter*, creamery, in storage on July 1, 1941, totaled 120,278,000 lb., compared to 81,005,000 lb. on the same date of 1940, and to an average of 98,203,000 lb. on July 1 of 1936-1940.

*Cheese*, all kinds, in storage on July 1 of this year amounted to 142,686,000 lb., up from 115,139,000 lb. on July 1 last year and from an average for the date in 1936-1940 of 104,087,000 pounds.

*Eggs*, case equivalent, in storage on July 1, 1941, totaled 11,547,000 cases, compared to 11,809,000 cases on July 1, 1940, and to an average of 11,309,000 cases for the same date in 1936-1940.

*Poultry*, frozen, all kinds, in storage on July 1, 1941, amounted to 85,874,000 lb. The figure a year before was 82,336,000 lb. and on July 1 in 1936-1940, the average was 64,693,000 pounds.

*Meat*, all kinds, in cure and frozen storage on July 1, 1941, was 851,640,000 lb., compared to 727,116,000 lb. a year before and to an average of 618,209,000 lb. for the date in 1936-1940.

*Lard in storage*, July 1, 1941, totaled 367,911,000 lb., and rendered pork fat on the same date totaled 7,743,000 lb. The combined figure for these two products on July 1, 1940, was 306,774,000 lb. and the average July 1 figure in 1936-1940 was 174,623,000 pounds.

*Weekly wholesale food price index* of Dun & Bradstreet on July 15, 1941, was $3.09, the highest level since the last week in 1929 and comparing to $2.23 on the corresponding July date of 1940.

*Business activity index* of *Business Week* on July 12 stood at 159.1, compared to a figure of 151.9 one month before.

*Cost of living index* of National Industrial Conference Board was 88.5 in June, 1941, as compared with 87.4 in the preceding month.

# PFAUDLER NEWS FLASHES

FOOD EDITION

August, 1941 PUBLISHED BY THE PFAUDLER CO., ROCHESTER, N. Y. Vol. 2, No. 11


# GLASS-LINED BEAN SOAKERS STEP UP PRODUCTION

## NO RETENTION OF OILS TO BECOME RANCID OR AFFECT FLAVOR

SPECIAL—Faced with the necessity of stepping up production for defense purposes in face of a diminishing labor supply, bean packers are depending on the efficient and economical performance of Pfaudler Glass-Lined Bean Soakers.

Easily kept sterile with minimum labor and expense, Pfaudler Glass-Lined Bean Soakers feature cone bottom construction with a six inch diameter outlet. After soaking, the beans are completely and rapidly discharged through the Scott non-clogging valve. This valve eliminates mashing the soaked beans and the clogging that otherwise occurs. Before refilling, the glossy, seamless, non-absorbent, acid-resisting surface of the glass lining of the Pfaudler tank can be quickly rinsed out, freeing the entire surface from the penetrating, sticky bean oil.

### Available in all Capacities

Pfaudler Bean Soakers are made in capacities ranging from 500 to 2,500 gallons. To figure the capacity required divide the quantity of dry beans in pounds by 2.7. Conversely to figure the dry beans in pounds that can be handled, multiply the capacity of tank in gallons by 2.7. Your first step in improving quality is to write for complete details.

Scott Non-Clogging Valve

## PFAUDLER KETTLES SPEEDIER FOR SAUCES, TOMATO PRODUCTS, ETC.

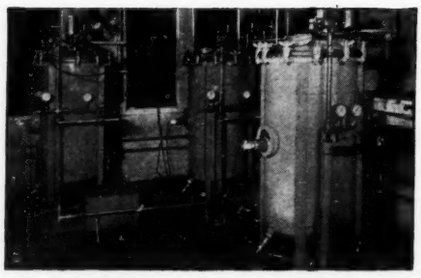
Pfaudler Steam Jacketed Stainless Steel Kettles, because of the greatly increased production they make possible, are preferred by many manufacturers of food sauces, tomato products and various other related products. Increased productive capacity is possible by greater speed in heating and through such features as the new flush valve that allows rapid bottom emptying. Unequalled ease of cleaning cuts down unproductive time between batches. Want the whole story?

## PFAUDLER "PRE-VAK" HELPS MEET VANILLA BEAN STORAGE

Rochester, N. Y.—Increased production of vanilla from available beans through the use of Pfaudler "Pre-Vak" Percolators has focused buying attention on the remarkable production records of this time-saving unit.

The Pfaudler "Pre-Vak," utilizing the pressure-vacuum principle in a Glass-Lined Percolator, yields a more concentrated and pure extract from any given quantity of vanilla beans than is possible by any other known method of percolation. Evaporation losses are minimized and channeling is eliminated.

The percolator is equipped with a heating unit which permits the second and third percolation of the same pack which considerably increases the volume of extract available from the same raw material. Concentrated vanilla extracts are at their best when prepared in a Pfaudler Glass-Lined vacuum distillation assembly. Catalog No. 759 shows you how to save most with Pfaudler Glass.



## PFAUDLER FOOD PROCESSING EQUIPMENT INCLUDES

| | | |
|---|---|---|
| Cooking Kettles | Extractors | Pasteurizers |
| Vacuum Pans | Storage Tanks | Starch Cookers |
| Syrup and Brine Mixers | Mixers of many types | Soakers |
| Tomato Products Cookers | Honey Blenders | Flash Heaters |
| Emulsifiers | Piston Fillers (for semi-liquids) | Colloid Mills |
| Juice Preheaters | Rotary Automatic Can Fillers | Cooling Coils (direct expansion) |
| Percolating Equipment | *(Send for literature)* | Deaerators |
| Evaporators | | |


**THE PFAUDLER CO.,** *Executive Offices:* Rochester, N. Y. *Factories:* Rochester, N. Y. and Elyria, O. *Branch Offices:* New York, Boston, Philadelphia, Chicago, Cincinnati. Pfaudler Sales Co., San Francisco and Los Angeles. Representatives in principal cities.

# MEN · JOBS · COMPANIES

## INDUSTRY

**Augusta County (Va.) Farm Bureau** has begun operation of its new $26,000 frozen food locker plant, a structure with over 300 lockers and a processing department.

**Walter Baker Co.,** Boston, Mass., is constructing a brick and steel building 55x282 ft. and 94 ft. high, at a cost of $135,000.

**Borden Co.,** New York, recently participated in a community celebration at Norwich, N. Y., in honor of Gail Borden, company founder. Star ceremony of the first American Dairy Day of Chenango County was the placing of a plaque on the Borden birthplace.

**British Columbia Packers, Ltd.,** Vancouver, B. C., is marketing two new products, curried salmon with rice and mushrooms, and salmon a la king, under its "Clover Leaf" brand.

**California Packing Corp.** is building a $60,000 addition to its corn cannery at Sleepyeye, Minn.

**Coca-Cola Bottling Co.,** Uvalde, Tex., has formally opened its new plant, 80x85 ft., of brick, concrete and hollow-tile construction. Large plate glass windows give the public a complete view of all bottling operations.

**Des Moines Valley Produce Co.** has awarded a contract for construction of a $75,000 storage and concentration plant in Perry, Iowa.

THOMAS B. SWANN

**New chairman of the Florida Citrus Commission, appointed by the governor to administer Florida citrus advertising and regulations during the year, is Thomas B. Swann, Winter Haven citrus grower and veteran citrus commissioner. He has served as a member of the Commission almost continuously since its formation six years ago.**

GEORGE H. EGGER

**G. H. Egger, formerly vice-president in charge of sales of Jefferson Island Salt Co., Louisville, Ky., has ben named vice-president of H. H. Clapp, Inc., Rochester, N. Y., manufacturer of baby foods.**

WILLIAM O. DILLINGHAM

**Best Foods, Inc., New York, has elected him vice-president in charge of eastern division sales. Mr. Dillingham joined the organization in 1925 and since then has served in numerous sales capacities.**

**General Seafoods Corp.** will reopen its Gloucester, Mass., plant in the fall, renovating and equipping the plant with facilities for the annual quick freezing and cold storage of 10,000,000 lb. of finished fish products.

**Haas-Davis Packing Co.,** Mobile, Ala., has completed a $50,000 expansion program. New additions to the plant have doubled its cooler facilities.

**Kelowna (B. C.) Growers Exchange,** Modern Foods Division, is producing white distilled vinegar in commercial quantities from cider vinegar by means of a vacuum process in a huge still.

**Kimbell Milling Co.** will reopen its plant at Wolfe City, Tex., improving the residence and office property and making changes in mill construction. Bill Davis of Sherman will be mill manager.

**National Biscuit Co.** has purchased the McDaniel Milling Co., Carthage, Mo., a plant with a daily capacity of 700 bbl. of wheat flour and concrete storage space for 250,000 bu. of wheat. National Biscuit now operates the nation's largest soft winter wheat mill, at Toledo, Ohio, with a 6,500-bbl. daily capacity.

**Pillsbury Flour Mills Co.,** Minneapolis, Minn., will establish new executive and general offices for 400 employees, in the Metropolitan Bank Building in that city. The building, which has won international architectural honors, will be ready for occupancy on January 1. Pillsbury is building additional elevators of 300,000-bu. capacity, and installing wheat-cleaning equipment at the Sacramento, Cal., unit of its Globe Mills Division.

**Reynolds Packing Co.,** Union City, Tenn., suffered damages of $80,000 to plant and equipment in a recent fire. The loss was partially covered by insurance.

**Rice Growers' Association** is building a new $75,000 warehouse in Houston, Tex.

**Southern Packing Co.** headed by H. L. McWilliams, has started operations at Anniston, Ala., to market a wide range of packing house products.

## PERSONNEL

**O. T. Avery,** Rockefeller Institute, New York, has been elected president of the Society of American Bacteriologists, succeeding Charles Thom, U. S. Department of Agriculture.

**A. R. Benedict,** manager of the John Morrell & Co. plant at Lincoln, Neb., has been transferred to the Brooklyn, N. Y., plant, Morrell's largest branch house. He was succeeded at Lincoln by K. W. Berggren who was transferred from Topeka, Kan.

**Ervin W. Brennen,** Springfield, Mass., has purchased the Amherst Creamery Co., 52 year-old manufacturers of ice cream mixtures and butter.

# ..Solves Hot Weather Mold Control Problems!

Bacteria and mold thrive during hot, humid weather! BUT . . . you can easily, effectively safeguard your product against bacterial contamination by using TESTED Oakite cleaning and germicidal materials.

FIRST . . . thoroughly clean sorting belts, cookers, vats, tanks, canning sinks, packing tables and floors with recommended Oakite material. THEN . . . at regular intervals . . . treat surfaces with solution of

## OAKITE BACTERICIDE

(PROTECTED BY U. S PATENT)

You will find high sanitary standards are maintained easily, at low cost, because this potent germicidal material, due to its MORE ACTIVE form of available chlorine, swiftly destroys bacteria and mold . . . provides a DEPENDABLE means of avoiding product contamination.

**We Want to Prove This!**

Food plants everywhere are profiting from this tested, successful Oakite way to maintain plant sanitation and QUALITY CONTROL. Let us prove how you, too, can gain the same benefits! Write today for FREE booklets giving particulars.

**OAKITE** *Tested* **CLEANING** FOR QUALITY CONTROL

**Complete Nation-Wide Service For These Industries**

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CONFECTIONERY
POULTRY PACKING
SEA FOOD
FLAVORING EXTRACTS
BOTTLING
DAIRY
COLD STORAGE
CEREAL PRODUCTS

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**Carl R. Fellers,** research professor of the department of horticultural manufactures, Massachusetts State College, Amherst, Mass., has been appointed head of the department, succeeding W. W. Chenoweth.

**G. E. Findley** has been promoted to director of research of Morten Milling Co., Dallas. Tex.

**John Will Gay** heads a new company formed at Scottsboro, Ala., to build and operate a cheese factory. Plans call for the plant to be constructed at a cost of about $12,500.

**Jim Haisten,** manager of the Crescent City, Fla., branch of American Fruit Growers, Inc., has become new manager of the Cocoa, Fla., branch of that company.

**Donald Odeen Hammerberg,** head of the department of agricultural economics at the University of Connecticut, Storrs, has been named Connecticut Milk Administrator, succeeding S. McLean Buckingham.

**Edwin B. Hart,** professor of agricultural chemistry at the University of Wisconsin, and Paul F. Sharp, professor of dairy chemistry at New York State College of Agriculture, Cornell University, have been presented with the Borden Co. annual awards for dairy research.

**D. Hurd Hudson** has been appointed state director of the Tennessee Brewers and Beer Distributors Committee, sponsored by United Brewers Industrial Foundation. From Nashville, he will direct operation of the beer industry's "clean up or close up" program in Tennessee.

**William H. Jones,** associate professor of chemistry at Emory University, Atlanta, Ga., has been granted a year's leave of

F. J. LUNDING

Jewel Tea Co., Barrington, Ill., has elected him executive vice-president, food stores, following the resignation of F. M. Kasch. Mr. Lunding has served as assistant to the president and as merchandising manager on all phases of store location, personnel and operations . . . Other Jewel promotions include the appointment of P. B. Boyd as executive vice-president, routes, and C. A. Larson as assistant secretary.

absence to undertake a research project at California Institute of Technology to produce concentrated synthetic vitamins.

**Samuel Martin,** owner and operator of a large pheasant farm at Freeland, Wash., will process frozen pheasants for national distribution under the trade-name "Wild Life in the Kitchen."

**John T. McCarthy,** president and treasurer of Jersey Bread Co., Toledo, Ohio, has been appointed special adviser on bread procurement in the Division of Purchases, OPM, succeeding Tom Smith, who has resigned.

**Donald J. McCullough,** office manager at Columbus, Ohio, for Loose-Wiles Biscuit Co., has sailed for Cristobal, Panama Canal Zone, where he will enter government service.

**John C. Peter,** manager of the Swift Canadian Co., Ltd., plant at New Westminster, B. C., has been promoted to assistant manager of the company's plant at Moose Jaw, Alta.

**Frank Prucha,** head cattle buyer for Swift & Co. at Omaha, Neb., has retired after 32 years of service during which he spent over a billion dollars for more than 10,000,000 head of cattle for the firm.

**T. M. Scoon** is new president of the Geneva Preserving Co., Geneva, N. Y., succeeding E. S. Thorne, resigned.

**Richard Westley,** Cargill Grain Co., Minneapolis, has been named assistant manager of the firm's Toledo, Ohio, office.

**Jack Whalen,** Pittsburgh district manager of National Biscuit Co., has been transferred to Springfield, Mass.

**R. B. Willson,** vice-president of John G. Paton Co., Inc., has been named president of the American Honey Institute.

**C. W. Wolfe,** Megs Macaroni Co., Harrisburg, Pa., has been elected new president of National Macaroni Manufacturers' Association.

# DEATHS

**Hinckley G. Atwood,** 69, president of Allied Mills, Inc., at Mayo Clinic, Rochester, Minn., recently.

**Robert Crawford,** 59, Highland Park, Ill., division manager at Chicago for Eskimo Pie Corp., July 10, in Indianapolis, Ind.

**Carson Collier Cumbea,** 44, associated with Pet Dairy Products Co., July 16, in Norfolk, Va.

**Joseph Illich,** 51, a Chicago packer, June 18, in Chicago. He was president of Prime Bros. and Co., and of Edgar Packing Co.

**Henry Johnson,** 75, candy manufacturer of Chicago, June 29, in Chicago.

**Phillip Jung,** 63, head of the former Jung Brewing Co. and president of the DePere Brewery Corp., June 29, in Oconomowoc, Wis.

**Harvey LeRoy Miller,** 47, vice-president in charge of production of National Biscuit Co., July 17, in Garden City, N. Y.

**Jaime Sifre Tarafa,** 84, leader in the sugar cane industry in Puerto Rico, July 12, in San Juan, Puerto Rico.

**John H. Wiles,** 80, vice-president and treasurer of Loose-Wiles Biscuit Co., June 22, in Kansas City.

# ASSOCIATED INDUSTRIES

**Allegheny Ludlum Steel Corp.'s** plant at Brackenridge, Pa., is installing two 35-ton electric melting furnaces in the new mill now under construction as part of the company's $4,650,000 expansion program.

**Allis-Chalmers Mfg. Co.,** Milwaukee, Wis., has established a new department of Priorities Management to help coordinate and direct company activities in matters pertaining to priorities.

**American Can Co.,** New York, plans construction of a $1,750,000 new factory on a 30-acre tract of land in St. Louis, Mo. The new plant will be 621x1,035 sq. ft., exclusive of office and cafeteria buildings.

**Gardner-Richardson Co.,** Middletown, Ohio, has appointed C. L. Keller as chairman of the board. Robert R. Richardson fills the board vacancy created by the death of J. M. Richardson.

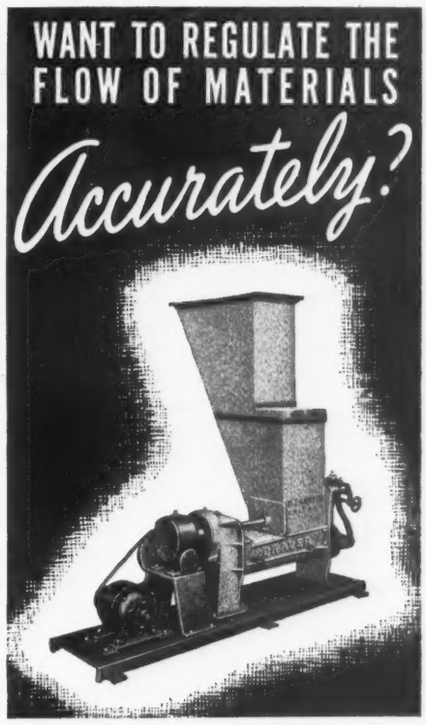
**Marmon-Herrington Co., Inc.,** Indianapolis, Ind., is completing an expansion program for defense work, which includes extension of the original truck-assembly building, administration offices and machine shops, and the erection of a shipping building and new assembly-line buildings.

**Minnesota Mining & Manufacturing Co.** is constructing a new factory for the exclusive manufacture of scotch tapes.

**Package Machinery Co.** has issued a statement that it will continue to make delivery on wrapping machines to customers despite the heavy demands of defense contracts.

**Joseph Ryerson & Son, Inc.,** has constructed a 66-ft. glassed-in connecting bridge between the two main office buildings at its 21-acre steel service plant in Chicago.

**Tanglefoot Co.,** Grand Rapids, Mich., has elected R. Y. Cutler president and E. J. Durkin, vice-president. Retiring president Phelps Newberry is new chairman of the board.


INVESTIGATE

DRAVER FEEDERS

IF accurate, controlled feeding of a dry, powdered or granular material is required, it's a job for a DRAVER.

These sturdy Feeders may be used to regulate the flow of materials from bins and hoppers to various production machines, such as grinders, sifters, etc., thus keeping them operating at maximum capacity without danger of choking or overloading.

Installed in groups with a Master Drive, they form a complete continuous system for accurately feeding two or more products and blending them to exacting formulas. Mechanical precision makes for uniformity of the finished product.

Draver Feeders and Master Continuous Mixing Systems are dependable, flexible and economical. Over 100 models and sizes available. Precision built, and widely used, they can be depended upon for years of low-cost, trouble-free operation. May we send you complete information? No obligation.

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Bar-Nun "Auto-Check" Weighers; Bar-Nun Bag Feeders and Weighers; Edtbauer-Duplex Automatic Net Weighers; Coffee Granulizers; Vibrox Bag and Barrel Packers; Ideal Green Coffee Cleaners; Bar-Nun Rotary Sifters; Magnetic Separators; Elevating and Conveying Equipment.

B. F. Gump Co

Established 1872

454 South Clinton Street Chicago, Ill.

## Cereal Antioxidant Prevents Tallowiness

(*Continued from page 36*)

turers. The data in Table IV indicate that the treated parchment helps in retaining the original flavor of the butter during storage. The score of the surface of the butter was approximately 2/3 point higher for the treated parchment-wrapped butter than that of the control parchment for the observations made. The greatest difference was observed during the first two to six weeks of the storage period, and after that period of time had elapsed the difference was less noticeable. It was also observed that the interiors of the butters wrapped in the treated parchment were given a slightly higher score than the control butter. These results are in agreement with those secured by Dahle and Josephson[3] and Koenig.[4]

Since many creameries give the parchment butter wrappers some form of sterilizing treatment to remove any mold spores which might be present, these studies include the most common methods of soaking the parchment in (1) hot water, (2) hot saturated salt solution or (3) formaldehyde solution.

The procedures used in these experiments were as follows:

1. Regular parchment, no treatment.
2. Cereal-sized parchment, no treatment.
3. Cereal-sized parchment held in boiling water for 30 minutes.
4. Cereal-sized parchment held in a boiling saturated salt solution and held for 30 minutes without further heating.
5. Cereal-sized parchment soaked in a cold formaldehyde solution (1 oz. of formalin to 2 gal. of water).

From the results given in Table V, the butter wrapped in the untreated cereal-sized parchment had the best keeping quality. Results obtained indicate that treating cereal-sized parchment paper with boiling water or hot saturated salt solution to prevent mold contamination is the most desirable as far as retention of the original flavor of the butter is concerned. Soaking in formaldehyde solution is the least desirable.

THE END.

## AMS Standards

(*Continued from page 44*)

U. S. GRADE B SPLIT or U. S. CHOICE SPLIT canned Kadota figs are figs which meet the requirements for U. S. GRADE B or U. S. CHOICE except that more than 20 percent by count of the figs are split.

U. S. GRADE D (Seconds) canned Kadota figs may possess a variable color, but are not off color; may vary in size and symmetry; may be broken or crushed and may possess prominent mechanical defects, but are fairly free from pathological defects; may possess a variable texture, but are not extremely mushy or hard and inedible; and possess a normal flavor.

OFF-GRADE canned Kadota figs are figs which fail to meet the requirements of the foregoing grades.

Canned Kadota figs are usually packed in sugar sirup. Sirup "cut-out" requirements, however, are not incorporated in grades of the finished product, as sirup as such is not a factor of grade for the purpose of these grades.

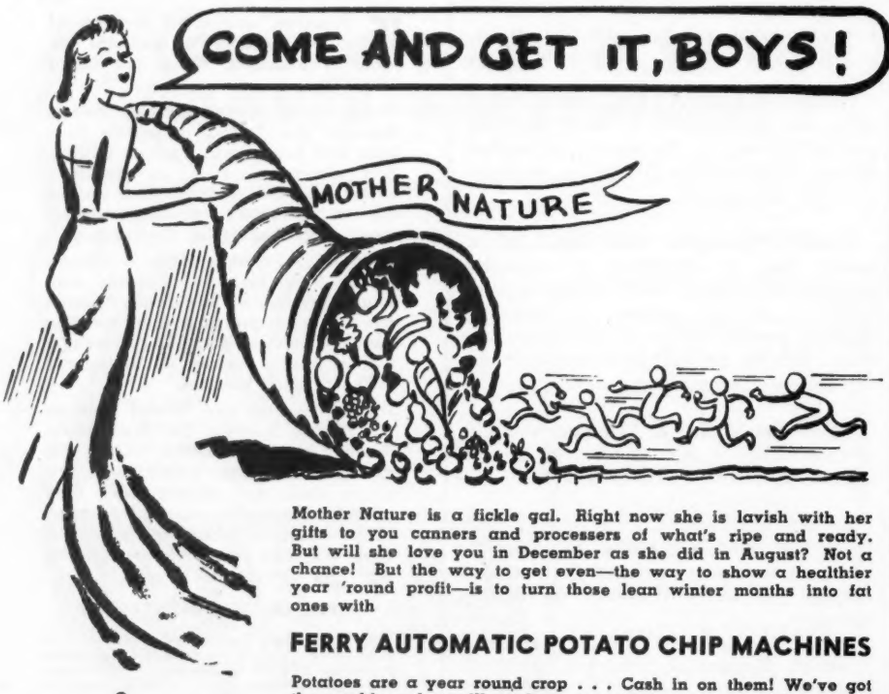
Canned Kadota figs will be certified as to grade without regard to sirup density, but in each instance official certificates of grade will bear a notation in connection with the grade statement indicating the density of sirup found upon examination. For this purpose, "extra heavy sirup" means that the sirup tests 30 deg. Brix or over. "Heavy sirup" means that the sirup tests 25 to 30 deg. Brix. "Medium sirup" means that the sirup tests 20 to 25 deg. Brix. "Light sirup" means that the sirup tests 15 to 20 deg. Brix. "Water pack" means that the packing medium tests less than 15 deg. Brix. The maximum head space and the minimum drained weights recommended for the cans commonly used in packing canned figs are shown in a table in the standards. The recommended maximum number of figs per can is indicated in another table. Official certificates of grade will indicate the range of count in the cans graded.

The grade of canned Kadota figs may be ascertained by considering, in addition to the foregoing requirements, the following factors: Color (25 points), uniformity of size and symmetry (15 points), absence of defects (25 points) and character of fruit (35 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

The factor ABSENCE OF DEFECTS has reference to the character of workmanship in the preparation of the product, and to the degree of freedom from crushed or mashed figs, scab, bruised spots, tough woody stems, spots of discoloration, or mechanical, pathological or insect injury of any kind.

ISSUED: Feb. 3, 1941.
EFFECTIVE: March 1, 1941.

THE END.


Mother Nature is a fickle gal. Right now she is lavish with her gifts to you canners and processers of what's ripe and ready. But will she love you in December as she did in August? Not a chance! But the way to get even—the way to show a healthier year 'round profit—is to turn those lean winter months into fat ones with

**FERRY AUTOMATIC POTATO CHIP MACHINES**

Potatoes are a year round crop . . . Cash in on them! We've got the machines that will produce a continuous and profitable stream of the finest chips you ever tasted—the kind that win new customers and keep old ones happy. Ferry Continuous Potato Chip Machines require only two operators and are available in capacities from 50 to 350 pounds per hour. If you're interested in the facts and figures on this year 'round money-maker write today for Bulletin F.I.

ALSO MAKERS OF:
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**J. D. FERRY CO.** 129 So. Cameron St. HARRISBURG, PA.

# LETTERS TO THE EDITOR

## Vanillin from Clove Oil

To the Editor
of FOOD INDUSTRIES:

Just what would you have us believe re vanillin in Hors d'Oeuvres? Eugenol, one of cloves ingredients has been used for synthetic vanillin as I remember it.—B. M. PILHASHY, *Merchants Exchange Bldg., San Francisco, Calif.*

## AMS Inspection —An Outside View

To the Editor
of FOOD INDUSTRIES:

I have perused with considerable interest your symposium on the AMS and the canning industry, published in the May number of FOOD INDUSTRIES.

By omitting consideration of the chief objection to the AMS system, you have made a fairly good case.

The chief objection to this or any other similar system is the atrocious bureaucracy it creates. The world is today shedding rivers of blood and undergoing tortures unbelievable on behalf of human freedom. However, the dictators we are fighting today are tame affairs as compared with a bureaucratic dictatorship, for eventually these few insane dictators will be disposed of—if not by the forces of democracy, a little later by the inevitable processes of nature. Bureaucracy, however, is immortal. The only way the country can be rid of it is by a revolution, and a revolution of terrific proportions and results—something similar to the French Revolution.

The Federal Food & Drug Administration greatly welcomed this cannery inspection business, for it gave this bureau an opportunity to greatly increase its influence, its personnel and the amount of funds it handles. The latter is the important feature, for under the law, the Secretary of Agriculture may prescribe "such rules and regulations . . . including payment of such fees as will be reasonable and as nearly as may be to cover the cost of the service rendered . . . and as will reimburse the Agricultural Marketing Service for the salary and all expenses of the factory inspector and fees of the official grader, to which shall be added an appropriate percentage of charges assessed to cover as nearly as practicable administrative overhead expenses."

The last clause, "administrative overhead expenses" will cover a multitude of sins—among others the payment of an elaborate and well-organized propaganda machine on behalf of the bureau and its bureaucrats. With this machine, it can control alleged consumer groups and keep up a battle ostensibly on behalf of consumers, but in reality on behalf of the bureau and its members. The latter method was exemplified recently in a hearing before the Federal Food & Drug Administration in which a woman testified that she was there representing 80,000 consumers who wanted a certain thing, according to her testimony. On cross examination, however, she was forced to admit that these 80,000 consumers were merely subscribers to a periodical which she and some of her associates published for profit, and that her expressions of opinion in said testimony were her own only. In other words, she didn't have the backing of a single person of this alleged 80,000 consumers. She, however, was put on the stand to testify by the Federal bureau.

The AMS may contribute some service to the packer and the consumers—probably does. However, the limited amount of service that it contributes is several times more than offset by the saddling upon the neck of the already overburdened public of an autocratic bureau with its thousands of parasitic minions, who cannot be gotten rid of once they are in office.

It is unnecessary to point out to you that these bureaucrats become civil service employees, with all of the appalling burden of waste and incompetency implied under the same.

With a force of bureaucrats such as would exist when all canning and food packing establishments come under the system, the Food & Drug Administration will be in possession of a club with which it can terrorize not only any packer into submission, but any consumers or consumer group.

Our cherished liberties—our bill of rights—our national independence for the individual, all are rapidly disappearing by just such methods as this AMS movement. If the canners only would, they could get together, police their own industry, and accomplish vastly more than any group of bureaucrats could accomplish with half the cost and no sacrifice of human liberty.

It, of course, should also be borne in mind by our optimistic reformers and consumers that all of such regulation inevitably will materially increase the cost of food to the consumers, for in last analysis, the consumers must pay the bill.—IRA D. CARDIFF, *President, Washington Dehydrated Food Co., Yakima, Wash.*

EDITOR'S NOTE: Dr. Cardiff's last suggestion was tried from 1919 to 1921 when the National Canners Association carried on its Inspection Service. That effort at self-policing ended unhappily for several reasons, not the least of which were the expense, the lack of real authority and occasional failure to give whole-hearted cooperation.

## Do Not Use Terne Plate

To the Editor
of FOOD INDUSTRIES:

In the June issue of FOOD INDUSTRIES, on page 82, there appears a release by the OPM asking can manufacturers to reduce the tin coating on cans. It is also suggested that terne plate be substituted for tin wherever feasible. Since the article mentions only food products, it might be assumed that some thought has been given to the use of terne plate for food containers.

Terne plate certainly has no place in the manufacture of containers or equipment used in the processing or packing of foods. The lead problem which has plagued the maple industry for the last five years and still continues to do so is chiefly due to the replacement of tin by terne plate on sap buckets and spouts, which was introduced during the first World War. The presence of lead in maple products was not discovered until about 20 years after the mistake had been made, principally because no one had previously looked for it but also because there were no rapid and accurate analytical methods for the amounts involved available until recent years.

In view of the fact that the Food & Drug Administration has urged that the use of terne plate utensils be discontinued ever since lead was first discovered in maple products, it is not likely that the Administration would approve its use for other food containers or equipment. In fact, under Sec. 420 of the Food, Drug and Cosmetic Act, food packed in terne plate containers could be considered adulterated simply because of the composition of the container.

It is quite possible that there was no intention to recommend terne plate for food container use. If there was, the unfortunate experience of the maple industry with this material should quickly discourage its use by others.—AUGUST CONLIN, *Chief Chemist, Cary Maple Sugar Co., Inc., St. Johnsbury, Vt.*

# Time to turn in your wrapper?

How long have you been using your present wrapper? Are you still satisfied with it? Suppose you look at it again critically? Would a new design or different color combination make it more appealing? Many of our customers tell us that the colorful new wraps we created for them are definitely helping win more sales.

If you are seriously interested, our art and printing departments are at your service and will gladly submit suggestions and ideas for a new Patapar wrapper for you. Easiest way to get started is to send us one of your present wrappers and indicate any changes you may wish included.

### *Why Patapar makes the ideal wrapper*

Patapar is not only insoluble and grease-resisting but also odorless, tasteless, and boil-proof. You can count on it to give the utmost protection.

And Patapar can be handsomely printed in one, two, or more colors to give you a wrapper of irresistible sales appeal.

**PATAPAR**
REG. U. S. PAT. OFF.
Vegetable Parchment
INSOLUBLE · GREASE-RESISTING
ODORLESS · TASTELESS · BOIL-PROOF

**PATERSON PARCHMENT PAPER COMPANY**
*Headquarters for Vegetable Parchment Since 1885*
Bristol, Pennsylvania
*West Coast Plant:* 340 Bryant St., San Francisco, Cal.
*Branch Offices:* 120 Broadway, New York, N. Y.
111 W. Washington St., Chicago, Ill.

# FOOD EQUIPMENT NEWS

## Magnetic Separator

FOR REMOVING IRON PARTICLES from free-flowing food materials such as sugar, grain, seeds, and so on, S. G. Frantz Co., Inc., 161 Grand St., New York City, has brought out the Ferro-Filter No. 68.

This device consists of a stack of several iron grids magnetized by a d.c. coil in a casing surrounding the grids. The grids are made of sloping vanes which act to divide and retard the flowing stream of material. Alternate grids have vanes sloping in opposite directions. In this way the material is caused to follow a zig zag path in passing through the separator, giving full opportunity for iron particles or magnetic materials to be caught by the edges of the vanes.

To clean the separator, nothing more is necessary than to turn off the current, whereupon the magnetic material falls through the machine. There are no moving parts. Feed is from a shallow hopper at the top and the discharge is directly from the bottom of the separator. Approximate dimensions, exclusive of legs, are, 19 in. in diameter and 15 in. in height.

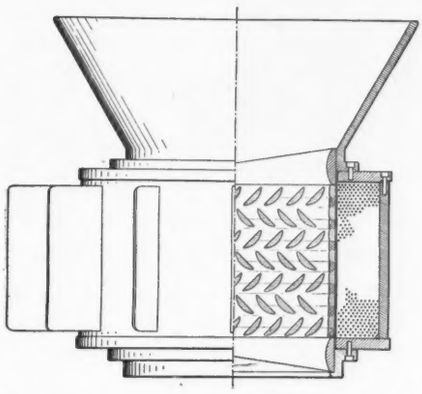
## Brewery Pump

A PORTABLE BREWERY PUMP has been placed on the market by Blackmer Pump Co., Grand Rapids, Mich. This pump is used for transferring yeast from the fermenting tanks to the collecting tanks, after the raw beer has been drawn off. It is connected to a rubber suction hose and is controlled by a pendant switch.

The pump is of standard Blackmer sanitary design, powered with a gearhead motor mounted on a common base. The entire unit is mounted on a truck for portability. In addition to handling yeast, this portable unit can serve as a general utility pump for other transfer operations.

## Milk Can Cleanser

A NEW BRIQUET for use in washing milk and cream cans, called the "Super-Nu-Fos" has been developed by Mathieson Alkali Works, Inc., 60 E. 42nd St., New York. According to the manufacturer, this cleanser removes milk residues effectively, leaving a clean rinsing surface and insuring low bacterial count, provides a practical control for hard water and eliminates the scaling up of machines. When it is used in the proper concentration, it is said not to injure tin coatings. It is supplied only in the form of hard briquets for use in the Nu-Fos alkalinity-control unit. This alkalinity control unit, supplied to users of the briquets, feeds the cleanser in solution into the washwater at a constant rate which can be regulated to suit conditions.



Magnetic separator for free-flowing food materials.

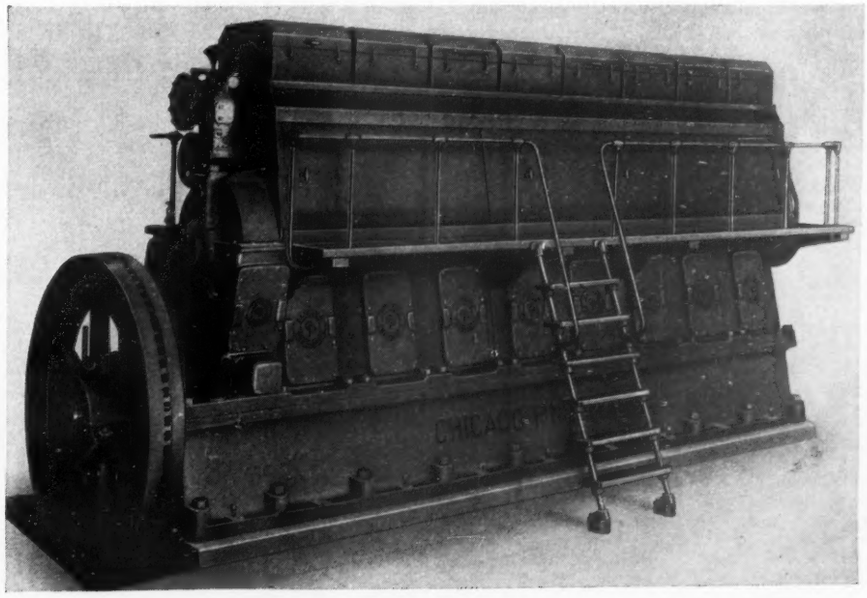
The advantages cited for this system are: The automatic feed insures washwater of proper strength at all times; the cleanser is consumed only while the washing machine is in operation; the system does away with the need of making up stock solutions of cleaning compounds; waste due to spilling is avoided; and the unit does not clog up with crystallized materials. With this system, the only regular attention required is the supplying of briquets to the unit as needed.

## Refrigerating Equipment

FRICK CO., Waynesboro, Pa., has brought out a new line of refrigerating machines particularly designed for use with Freon-12 on air conditioning work for food processing plants. These machines, called the "Eclipse Models" are available in three sizes. Capacities range up to 60 tons of refrigeration in a single machine. The machines are built with 3, 4 or 6 cylinders, for operation at speeds up to 900 r.p.m. Standard drive is by V-belt, but motors can be installed directly on the shaft when desired.

## Diesel Engines

FOR SUCH APPLICATIONS as generator drives, power drives, compressor drives, and the powering of refrigeration plants, Chicago Pneumatic Tool Co., 60 E. 44th St., New York City, has brought out the Type 16 diesel engine. This is a heavy-duty machine with from two to eight cylinders available in powers from 375 to 1,000 hp. It is so designed that it can be converted to operation with gas at any time the owner desires and then reconverted to diesel operation. It is of the four-cycle, direct-injection type, and is especially designed for continuous duty.



Heavy-duty diesel engines designed for converting to gas fuel when desired.

## Explosion-Proof Motor

CENTURY ELECTRIC CO., St. Louis, Mo., has brought out an explosion-proof motor particularly designed for use in explosive atmospheres containing grain dust. This totally inclosed, fan-cooled motor has been approved by the Underwriters' Laboratories for so-called "Class 2, Group G," atmospheres.

## Adjustable Speed A.C. Drive

DESIGNED ESPECIALLY for industrial applications requiring smoothly adjustable speed over wide ranges with constant torque, in locations where only a.c. supply is available, a new 10 to 1 adjustable speed drive which uses a series circuit without the usual exciter, has been developed by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. This drive is available in ratings from 1 to 15 hp. with a standard speed range of from 175 to 1750 r.p.m., for 2 or 3 phase operations on 220, 440 or 550 volt, 60 cycle systems.

The drive has five parts including control as follows: (1) A single unit motor generator set consisting of a squirrel cage induction motor, driving a series d.c. generator which supplies operating voltage for (2) a d.c. series motor coupled to the driven load; (3) in parallel with the generator series field is a rheostat which controls the driving motor speeds; (4) control apparatus consisting of an across-the-line starter for the squirrel-cage motor; (5) and a push-button station.

The manufacturer states that this drive is more flexible than the wound-rotor motor and is more efficient than the conventional variable voltage system because it has no exciter rotational losses. In it, high torque characteristics of the d.c. series motor are combined with the flatspeed properties of the shunt motor to give good speed-torque characteristics.

Optional features with this drive include dynamic braking and inching. Dynamic braking requires no external braking resistor, but employs a braking field wound right into the motor. Horsepower ratings are based on top speed of 1750 r.p.m. at 40 deg. C. Continuous operation. Open frames are standard, but splashproof and totally inclosed frames can be supplied when desired.

## Comparison Demonstrator

KIMBLE GLASS CO. (Ruth Glass Division), Conshohocken, Pa., has developed a device for giving visual proof of dirt, rust or other impurities in liquids. This is particularly designed as a help in controlling the appearance and quality of various liquids and oils.

These demonstrators are available in single-barrel, two-barrel and three-barrel design, for comparison of control samples, dirty liquids and treated liquids. The flat-glass barrels are designed to show off the impurities and color of the liquid to the maximum advantage.

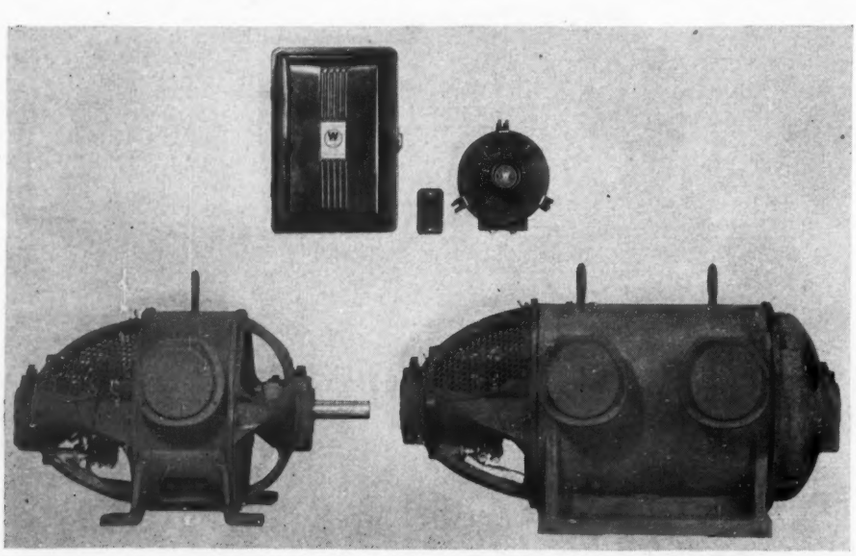
Comparison demonstrator for observing color, sediment and quality of liquids.

## Meter for Vitamin $B_1$ and $B_2$

PHOTOVOLT CORP., 10 E. 40th St., New York City, has designed the Lumerton Fluorescence meter, an instrument for measuring the fluorescence of a solution in such operations as the thiochrome method of determining vitamin $B_1$ and the method of D. B. Hand for determining vitamin $B_2$. The makers claim that one of the most important features of this instrument is that instability of readings, caused by fluctuation of the light output of the mercury vapor lamp, are effectively eliminated and that strictly reproduceable measurements are obtained. These stable readings are obtained through the use of a balanced bridge circuit.

In operation, the light of the mercury vapor lamp after it passes through a filter which transmits only ultra-violet light, is split into two beams, one entering the sample holder and acting by fluorescence on the measuring photocell, the other acting upon a balance photocell. The ratio, not the actual amount, of the current produced by the cells is used to measure the fluorescence so that a change in the light output, acting equally on both measuring and balance cells, has no effect upon the readings. The light enters the sample holder in a strictly parallel beam. Two high sensitivity self-generating photocells, acting in parallel, are arranged on the two sides of the sample holder so as to utilize the greatest possible amount of fluorescence and to permit measurement of extremely low concentrations. About 12 c.c. of liquid are sufficient for fluorescence determination. Color filters between sample holder and photocells are used to eliminate the influence of primary (ultra-violet) fluorescence which may be scattered by suspended particles in the solution, thus excluding the effect of turbidity. A high sensitivity multiple reflection galvanometer, recently developed by General Electric Co., is used as a current indicator.

The manufacturers also state that a further important feature of the design consists in the fact that the same instrument can be used for transmission measurements. Such measurements, involv-



Adjustable speed a.c. drive composed of these five units, which form the complete drive including the control.

ing ultra-violet absorption, can be used to determine vitamin A concentration. Also, the mercury vapor lamp can be replaced by an incandescent lamp so as to extend the field of application of the instrument to the determination, by means of transmission in the visible range, of vitamins C, D, E, carotene and nicotinic acid as well as to general colorimetric and abridged spectrophotometric work.

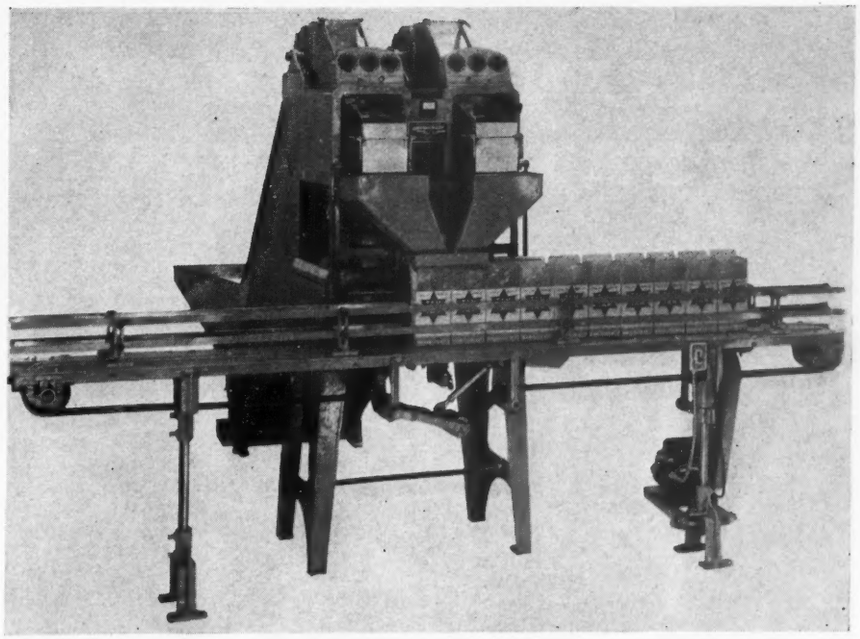
For taking reflection measurements on solids, powders and opaque liquids, a special reflecting unit can be attached to the instrument.

## Splashproof Motor

General Electric Co., Schenectady, N. Y., has introduced into its "Tri-Clad" line of motors a splashproof, ball bearing, polyphase induction motor that comes in 1 to 15 horsepower. This new line is particularly designed to meet the needs of applications where splashing water and other liquids are present as in dairies or breweries.

In general, this new line embodies the features of the recently announced general purpose Tri-Clad motors. Outstanding features include stator frame and end seals, that resist rust and corrosion. The Formex wire windings are highly resistant to moisture and the ball bearings are thoroughly protected from moisture. The ventilating openings of this motor stator frame and end seal are baffled to block the entrance of splashing liquids. An arrangement of cast baffles within the side openings of the stator frame blocks splashing from the side. Additional protection is provided by the covering of Glyptal plastic over the windings. Ample space for making connections quickly is afforded by this motor's liquid-tight cast iron conduit box built into the motor frame.

New splashproof motor for dairies, breweries and other food plants.



Vibratory feed weigher for filling cartons with cookies, crackers and similar food products.

## Ribbon Ice Machine

York Ice Machinery Corp., York, Pa., has introduced the Model DER-25 Flak-Ice Frosty Ribbon machine. This is a remotely refrigerated machine, capable of producing up to 4 tons of ice ribbons per day in continuous or intermittent service as needed.

Designed for conservation of floor space, this model can be suspended from the ceiling nearest to the point where the ice is needed, and the only floor space required is that necessary for a bin to catch the ice ribbon. The refrigerating unit can be located in another room where more space is available.

Connected to refrigerating units of 5, 7½ or 10 hp. capacity, respectively, the Model DER-25 machine will produce 4,700 lb., 6,160 lb. or 7,340 lb. of ice per day at 60 deg. F. water temperature. The machine is recommended for use by such food industries as those engaged in the processing of fish, sausage, baked goods, dairy products, poultry or produce.

## Guard for Portable Mixer

A metal ring guard that also acts as a stand is now available for use on clamp-type portable air-motored mixers and agitators made by Eclipse Air Brush Co., 400 Park Ave., Newark, N. J. In this guard, a ring protects the impeller from contact with the mixing vessel when in use. The ring and its four metal supports provide a stand for the mixer which makes it easy to store the device when it is not in use.

The four metal supports that hold the ring in place serve to protect the shaft and prevent its getting out of alignment. Two metal handles alongside of the air motor at the top of the frame are useful for lifting the agitator from the mixing vessel.

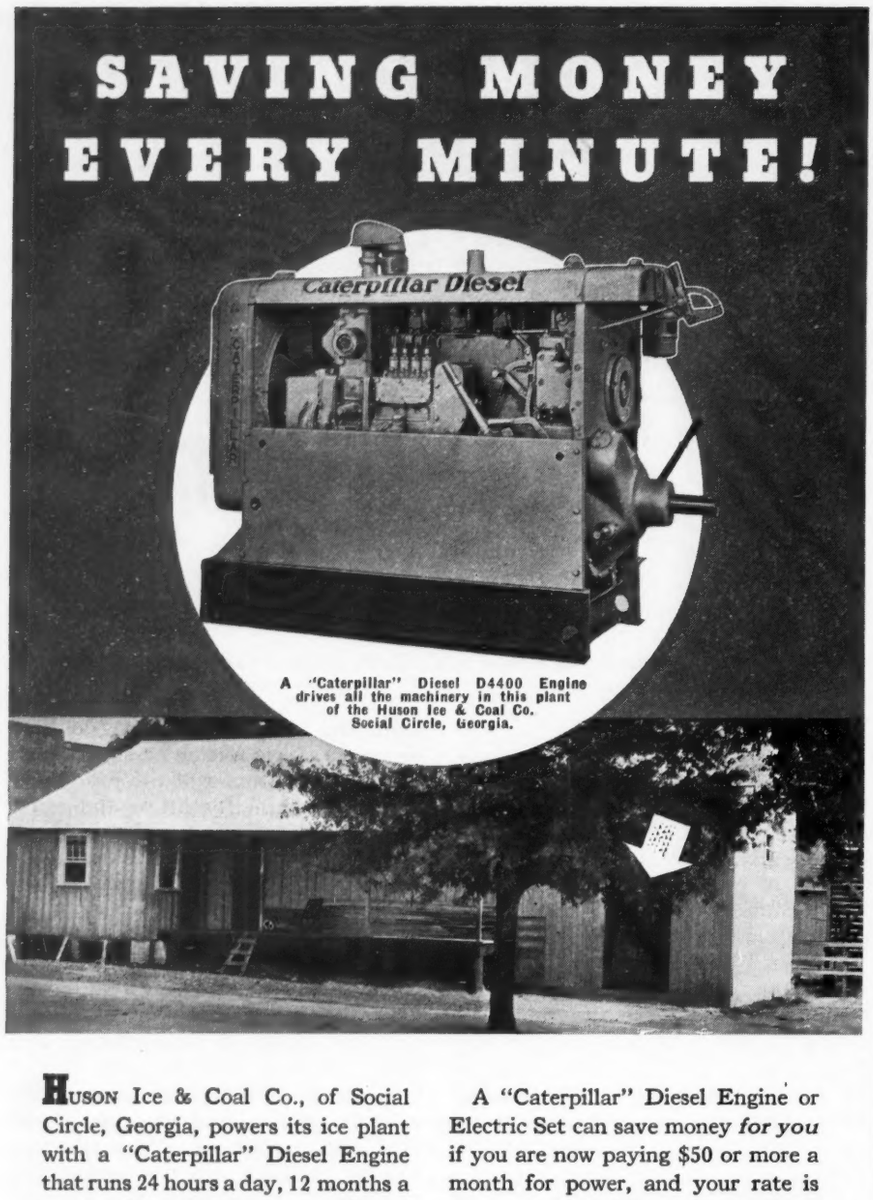
## Vibratory Feed Weigher

Triangle Package Machinery Co., 900 N. Spaulding Ave., Chicago, has developed a completely automatic model of the "Elec-Tri-Pak Weigher" especially designed for weighing and filling cookies, crackers and similar food products into cartons with or without liners. Designated as Model N2-C, this machine is a twin vibratory feed weigher that fills two packages at one time. It is equipped with a power-driven conveyor carrying the packages up to and away from the machine. Equipment also includes an automatic control which stops discharge from the machine if the packages fail to reach the discharge spout. For packages with liners, automatic liner spreaders are supplied.

Packages filled by this machine may vary from 4 to 16 oz. and the output is 15 to 25 packages per minute. The accuracy is said to be exact weight to one or two pieces plus or minus.

Products being packaged by this equipment are carried by belt conveyor from a hopper onto electrically vibrated feed plates. Weighing is accomplished in the discharge spouts which are connected directly to scales set to a predetermined weight. When the load in the spout balances the scales, discharge from the feed plate automatically stops. After the load has been discharged into the package, the feed cycle is repeated. It is claimed

# SAVING MONEY EVERY MINUTE!




A "Caterpillar" Diesel D4400 Engine drives all the machinery in this plant of the Huson Ice & Coal Co. Social Circle, Georgia.

HUSON Ice & Coal Co., of Social Circle, Georgia, powers its ice plant with a "Caterpillar" Diesel Engine that runs 24 hours a day, 12 months a year, and saves money every minute!

The engine supplies power for making 3600 pounds of ice daily on only one gallon of 8c fuel per hour!

P. J. Huson, the owner, operates a larger ice plant at Covington, Ga., also powered by a "Caterpillar" Diesel Engine. He estimates his annual saving in the Covington plant at over $1500, as compared with purchased electric power! Says Mr. Huson: "I am more than satisfied. Plenty of power and no trouble since installation. This outfit is what ice manufacturers need."

A "Caterpillar" Diesel Engine or Electric Set can save money *for you* if you are now paying $50 or more a month for power, and your rate is 2c or more per kilowatt-hour. SEND FOR FREE LITERATURE. Give a brief description of your plant and your present average monthly power bill.

CATERPILLAR TRACTOR CO.
DEPT. FI-8 PEORIA, ILL.

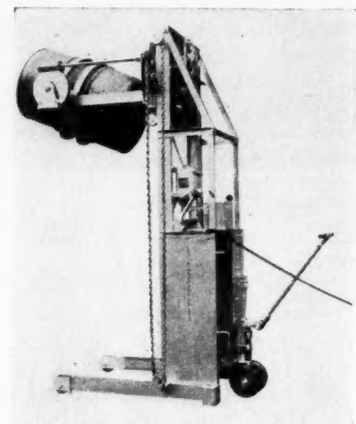
• "Caterpillar" Diesel Engines and Electric Sets are built for long life and heavy duty. They operate efficiently on low-priced, low-grade fuel — such as No. 3 domestic burner oil. Self-contained and self-regulated, "Caterpillar" Diesel Electric Sets supply steady voltage without the need of switchboard, voltage regulator or other external control apparatus.

CATERPILLAR
REG. U.S. PAT. OFF.
DIESEL ENGINES AND ELECTRIC SETS


that this machine will handle the most delicate products without breakage and that all fine particles are screened out during the package filling operation.

## Drum-Dumping Stacker

LEWIS-SHEPARD SALES CORP., 245 Walnut St., Watertown, Mass., has brought out a new type of drum-dumping stacker for handling the dumping of drums, barrels and other containers of liquid or dry materials. The purpose of this device is to permit the operator to control from the floor the dumping of



Drum-dumping stacker for emptying containers in elevated positions.

the container while it is in elevated position. A self-locking worm makes it possible to hold the drum instantly for as long as desired in any position. Control from the floor also permits the operator to reverse the tilting of the drum or barrel, and also to slow down or stop the flow of material from the container.

## Water Filter

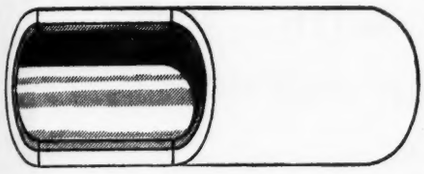
STAYNEW FILTER CORP., Rochester, N. Y., has applied the "radial fin construction" used in their air filters to a new type of water filter. Known as Model OPHLS for water filtration, the new filter is of simple construction and positive filtering action. All of the water passes through special fabric filter mediums said to possess the advantage of high efficiency plus minimum restriction of water flow. The construction permits a large area of filtering medium to occupy a relatively small space. For example, a radial fin construction insert only 11 in. high by 8¼ in. in diameter possesses an active filtering area of 1,325 sq. in.

There are no moving parts in the new filter and the large filtering area is said to permit long periods of operation without attention. When attention is necessary, the entire insert can be easily

removed by unbolting the head and removing one wing nut. Units can be installed so that cleaning is effected by backwashing with clean water. Additional advantages claimed for this filter are lightness and compactness.

## Bi-Metal Tubing

FOR APPLICATIONS of tubing and piping where a single metal or alloy fails rapidly from corrosive attack, or where it causes rancidity or metallic contamination in a food or liquid, Bridgeport Brass Co., Bridgeport, Conn., has developed "Duplex" tubing. This tubing has an inner tube of one metal or alloy and an outer tube of a different metal or alloy. The metals are chosen

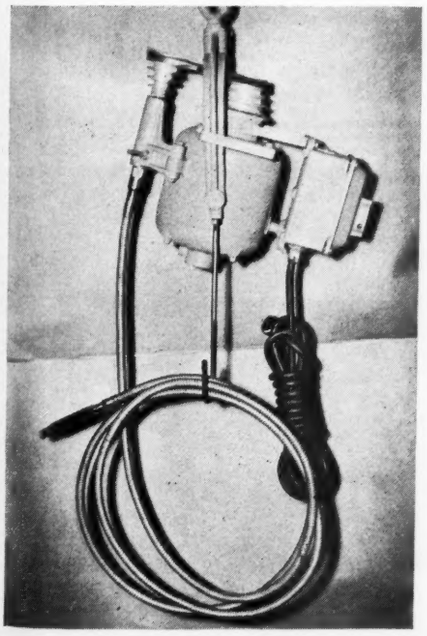


**Tubing constructed of two metals or alloys to avoid contamination of food liquids or corrosion.**

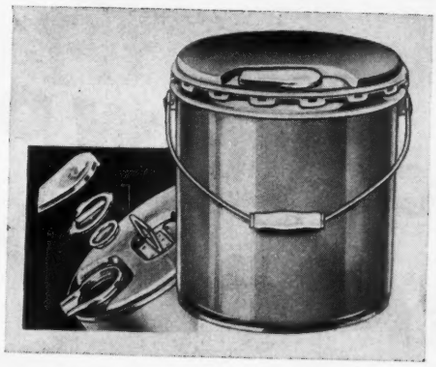
to meet the specific application being made. For example, in a food plant where oils become rancid in ordinary tubing, a combination of stainless steel and brass has been used.

## Steel Container With Pouring Spout

WILSON-BENNETT MANUFACTURING Co., 6534 S. Menard Ave., Chicago, has developed the Type R "Por-Pail",



**New kettle scrubber is similar to this suspended type of tube cleaner except that it has a 40-in. support handle on the brush.**



**Steel container with pouring spout comes in 5 and 10 gal. sizes.**

a steel container in 5 and 10 gal. sizes suitable for sirups, oils and other foodstuffs. In these containers, the top and bottom heads are rounded, respectively, in convex and concave shape, so that the containers will nest one on top of the other. In addition, the rims are raised to create an interlocking effect when the containers are stacked. In this way, the containers can be stored or displayed in vertical stacks with safety.

The 5-gal. size is available with either separate lug-type cover or with integral seamed-on cover. The first model has the familiar wooden baling type handle while the closed container has an easy-grip handle that fits into a recess in the cover. The 10-gal. size is available only in the drum type with integral seamed-on cover.

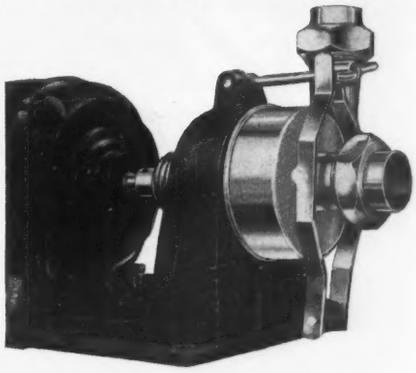
Three different types of pouring spouts are available on this container. The standard closure has an outer dust cap, a twist cap, an inner seal and a swivel spout that swings out of the way when the containers are stacked. The other two openings available are a narrower threaded type with inner seal and dust cap and the government-approved type with raised eyelets to allow sealing.

## Kettle Scrubber

FOR CLEANING KETTLES, National Electric Manufacturers Co., 60 E. 42nd St., New York City, has developed a solution feed kettle scrubber. This unit is similar to that shown in the accompanying photograph except that the brush at the end of the 15-ft. flexible shaft is equipped with a supporting handle about 40 in. long. The solution is fed through a tube which is twined with the driveshaft inside of the flexible covering. This solution sprays out through the bristles of the brush to the surface that is being cleaned and scrubbed by this rotating brush.

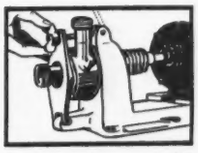
This kettle scrubber can be mounted on a track in front of the kettles or on a crane support designed to service a number of kettles.

WRIGHT QUICK-CLEANING STAINLESS STEEL PUMPS

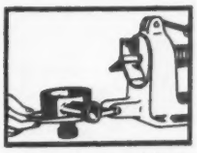


Outstanding features and advantages that provide most effective pumping of liquids make Wright *Stainless Steel* Pumps highly successful for a wide variety of applications in the food industries.

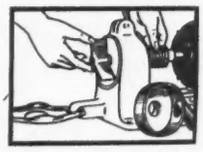
These time-tested and proved *stainless steel* pumps are extremely sanitary, durable and efficient. They reduce operating and maintenance cost and are quickly taken apart for cleaning in 5 seconds.



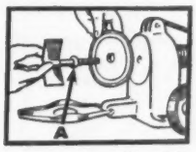
1 Twist wing nut holding clamp and swing locking nut out of way.



2 Lower clamp and body ... which is then easily removed.



3 Turn impeller backward to unscrew shaft from spring coupling.




4 Remove impeller with shaft, and face plate. Slip seal ring "A" from shaft.

R. G. WRIGHT COMPANY, INC.
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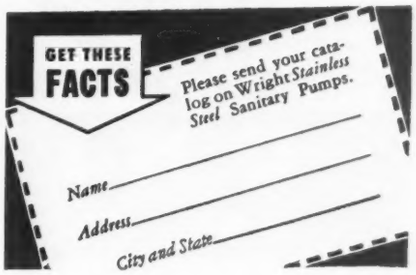
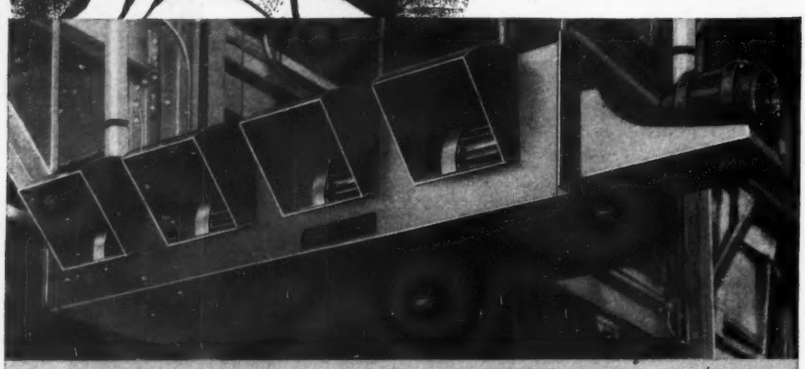


# COLD WORKERS CRAMP PRODUCTION

## Keep Winter-Time Schedules in High Gear with "Buffalo" UNIT HEATERS



The Buffalo Low Boy (above) for ceiling installation and the companion Buffalo High Boy Unit Heater for floor installation provide uniform heat distribution over extensive areas. Substantially built; economical to operate. Wide range of sizes. Bulletin 3134-A.

Cold hands and feet, chilly spirits put a crimp in the efficiency of any department. Buffalo Unit Heaters end this winter slow-down. Easily and economically installed almost anywhere. For general warmth, or "spot" heating—Buffalo Unit Heaters provide comfortable warmth, directionally controlled. Sizes to fit any type of structure, new or old, regardless of area or ceiling height. Write for full details stating the type of installation in which you're interested.

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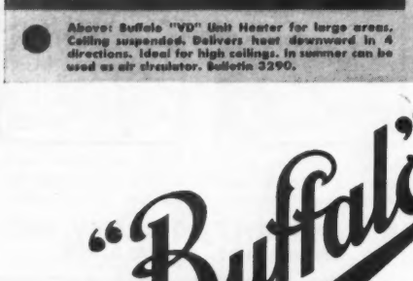
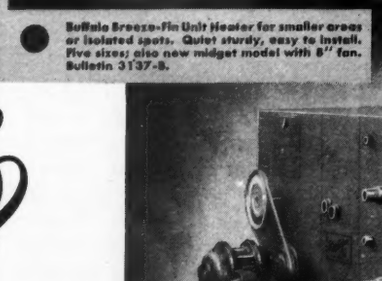
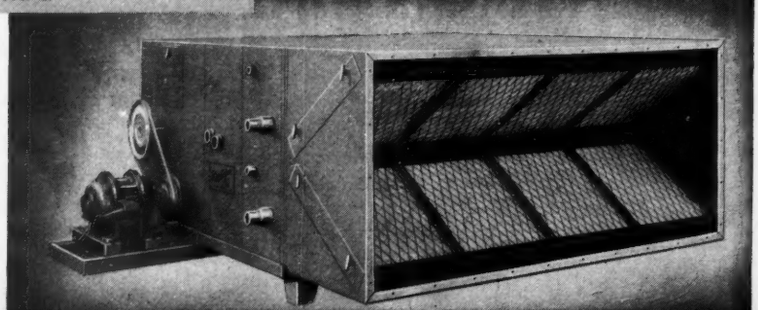


Above: Buffalo "VD" Unit Heater for large areas. Ceiling suspended. Delivers heat downward in 4 directions. Ideal for high ceilings. In summer can be used as air circulator. Bulletin 3290.



Buffalo Breeze-Fin Unit Heater for smaller areas or isolated spots. Quiet sturdy, easy to install. Five sizes; also new midget model with 8" fan. Bulletin 3137-B.

Buffalo "PC" Cabinet—the first step in complete air conditioning. Can be used first as heating unit; with air cleaning, and cooling added later on. Bulletin 502-A.



"Buffalo"

**UNIT HEATERS**
**AND "PC" CONDITIONING CABINETS**

# JUST OFF THE PRESS

## BOOKLETS • LITERATURE • BULLETINS

### FOOD PLANT EQUIPMENT

**Conveyor Idlers**—A new line of rubber-treaded return idlers for belt conveyors from 14 to 60 in. in width is described with specifications in folder A-640 issued by Link-Belt Co., 307 N. Michigan Ave., Chicago.

**Filling Equipment**—The "Universal Filler," a machine for filling a wide range of materials into a wide range of sizes and types of packages, employing the auger principle, is described in a recent bulletin of Stokes & Smith Co., 4901 Summerdale Ave., Philadelphia.

**Food Plant Motors**—Protected types of streamlined motors, designed particularly for use in dairy plants and other food industries are described in Bulletin DC-70 published by Howell Electric Motors Co., Howell, Mich.

**Materials Handling Equipment**—In general catalog No. 40, a full line of materials handling equipment for food industry and other plants, together with power transmission equipment and such industrial machinery as cottonseed oil mill equipment, are described by the Continental Industrial Div., Continental Gin Co., Birmingham, Ala.

**Mixing Equipment**—"Flexibility in Mixing Operations" is the title of an eight-page bulletin describing the Glen 340 batch mixer, its operations, and various attachments such as bowls and agitators that are available with it, published by American Machine & Foundry Co., 511 Fifth Ave., New York.

**Refrigeration Equipment**—Ammonia compressor refrigeration equipment for the food industries is illustrated and described in a folder, Form 1743, published by Creamery Package Mfg. Co., 1243 W. Washington Blvd., Chicago.

**Refrigeration Equipment**—Condensing refrigeration units, in sizes from ¼ hp. to 25 hp. for use in industrial refrigerating and air conditioning operations, are described with specifications and dimensional drawings in the new catalog of Brunner Mfg. Co., Utica, N. Y.

**Sanitary Glass Pumps**—A new size of Pyrex all-glass pump for sanitary installations, size ¾ x 1 in., is described and illustrated with specification in Bulletin 336 of Nash Engineering Co., South Norwalk, Conn.

**Water Stills**—Automatic stills for supplying pure distilled water, heated by gas, steam or electric current, in capacities from 2½ to 6 gal. per minute, are described in Catalog No. 41-F, issued by F. J. Stokes Co., Tabor Road, Olney P. O., Philadelphia, Pa.

**Water Treating Equipment**—"Double Check" Zeolite water softeners for use in treating boiler feed water and process water are described in Bulletin No. 605 issued by Elgin Softener Corp., Elgin, Ill.

### PLANT SUPPLIES

**Bearing Bronze**—A new general catalog of stock sizes of bearing bronze, together with a comprehensive price list, has been issued as 76-page Catalog No. 410 by Johnson Bronze Co., New Castle, Pa.

**Diesel Engine**—How existing diesel engines can be modernized by the use of certain changeover parts, including cylinder heads, cylinders, pistons, connecting rods and so on, is explained in a 12-page illustrated bulletin entitled "Modernizing your Diesel" published by Fairbanks-Morse Co., Chicago, Ill.

**Oil Burners**—Many installations of oil burners in industrial plants and other locations are illustrated, with a description of the burners, in a 8-page bulletin published by National Airoil Burner Co., Inc., 1284 E. Sedgley Ave., Philadelphia, Pa.

**Pumping Equipment**—Diaphragm pumps for such industrial services as the operation of filters and the handling of food liquids, are described in Bulletin No. 112 of T. Shriver & Co., Harrison, N. J.

**Reduction Drive**—A geared reduction drive to use in connection with a single V-belt reduction to give speeds between 11 and 250 r.p.m., from ½ to 30 hp., is described in Catalog R-41 issued by the American Pulley Co., 4200 Wissahickon Ave., Philadelphia, Pa.

### CONTROL EQUIPMENT

**Automatic Controls**—Hydraulic automatic controls for the automatic synchronization of machines, for automatic speed control and for other uses in connection with Reeves variable speed transmissions, are described with application data in a folder published by Reeves Pulley Co., Columbus, Ind.

**Control Equipment**—A condensed catalog describing the complete "Wheelco" line of control equipment, in particular temperature controls, has been issued as Bulletin No. X-4000 by Wheelco Instruments Co., 1292 S. Halsted St., Chicago.

**Control Equipment**—Non-indicating temperature and pressure controllers of the air-operated remote bulb type, are described with application information, particularly as referring to such equipment as blanchers, coolers, chill vats, beer pasteurizers and other food equipment in bulletin 77-2 issued by Brown Instrument Co., Wayne & Roberts Ave., Philadelphia, Pa.

**Control Equipment**—A line of motor power units and motorized valves, designed to operate with control instruments in a control system, forms the subject of catalog No. 77-1 of Brown Instrument Co., Wayne & Roberts Ave., Philadelphia, Pa.

**Motor Control**—"More for your Control Dollar" is the title of a 12-page bulletin illustrating applications of motor control, published by General Electric Co., Schenectady, N. Y.

**Photoelectric Florimeter**—An instrument for chemical analysis by means of measuring the intensity of fluorescence produced in a solution under controlled conditions of illumination, called the "Spekker Fluorimeter" is described in Bulletin SB295 published by Adam Hilger, Ltd., 98 St. Pancras Way, London, N. W. 1, England.

**Recording Instruments**—In 16-page illustrated bulletin 570, strip chart recording instruments for pressure, liquid level, flow, mechanical motion and other measurements are described with application information by the Bristol Co., Waterbury, Conn.

### MISCELLANEOUS

**Building Material**—The use of "Century" asbestos corrugated roofing and siding for the quick and adequate construction of industrial buildings is described and illustrated in a 32-page bulletin issued by Keasbey & Mattison Co., Ambler, Pa.

**Employee Selection**—A 16-page booklet entitled "The Use of Ability and Aptitude Testing in Business" gives a simple explanation of a scientific plan, used in testing prospective employees, as developed by the Personnel Institute, Inc., 225 North Wabash Ave., Chicago, Ill.

**Synthetic Rubber**—"Hycar" is the title of a booklet issued by the Hydrocarbon Chemical & Rubber Co., Akron, Ohio, describing various forms of synthetic rubbers, in particular Hycar O. R., an oil resistant type.

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This new vitamin product, which contains not less than 4500 micrograms of riboflavin per gram, is economically priced on the basis of this factor alone, but because Solvamin is a *natural* product, other important members of the vitamin B complex are present in significant amounts. Every gram of Solvamin contains approximately 500 micrograms of pantothenic acid together with small amounts of thiamin ($B_1$), pyridoxin ($B_6$), and biotin.

Solvamin is an excellent medium for adding riboflavin to cereals, flour, candy and other food products. A request on your letterhead will bring a sample and detailed information.

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## SOLVAMIN *Rich in Riboflavin*

# FOOD TECHNOLOGY

## NEW DISCOVERIES AND INVENTIONS

## CONFECTIONERY

### Bacteriology of Candy

BACTERIAL examination of chocolates, caramels, coconut cubes, mints, candy bars, candy and cough drops, Easter eggs, taffy and fudge showed that initial condition of the raw materials shares responsibility with sanitary conditions during manufacture when the final bacterial count is high. Factory-wrapped candies and properly handled hard candies (if subject to high heat in manufacture) generally have low bacterial counts while raisin and nut confections are likely to show a high count and a wide variety of organisms. Chocolate products tend to have high counts. *Escherichia coli* was not found in any of the candy samples. Survival time varied considerably, averaging slightly over 25 days, when *Escherichia coli*, *Eberthella typhosa* and several varieties of Salmonella were inoculated into fondant and chocolate fudge.

Digest from "Bacteriology of Candy," by Fred W. Tanner and Don M. Snyder, *Proceedings of the First Food Conference*, Institute of Food Technologists, 1940, p. 307.

## CANNED FOODS

### Process Determination In Canning

SELECTION of a sterilization process which will give adequate protection without unnecessary expenditure of time and heat is based on test packs which are inoculated with a suitable test organism. The principal standard organisms now used for test packs are *Clostridium botulinum* as a typical health hazard, *Cl. sporogenes* for higher heat resistance, *Cl. thermosaccharolyticum* as a thermophilic anearobe and *B. stearothermophilus* as a flat-sour type. The selection depends on the conditions to be met. If health protection is the sole objective, the choice is *Cl. botulinum*, but for protection against the various spoilage hazards an appropriate member of the spoilage organisms is chosen. Test packs are then made under varying conditions of time and temperature so that the most economical cook which will give safe protection can be ascertained. Thus, in one case, heat-penetration and heat-resistance tests were used to calculate a cook, and the result of the calculation was 11.6 minutes at 240 deg. F. Test packs showed that a 12-minute cook still left 1.9 percent of nonsterile cans, but all cans were sterile if the cook was longer than 12 minutes. In general, there is similarly good agreement between the calculated process and the test process when sound principles are followed.

Digest from "Experimental Procedure for Process Determination for Canned Foods," by O. B. Williams, *Proceedings of the First Food Conference*, Institute of Food Technologists, 1940, p. 323.

## DAIRY PRODUCTS

### Organic Acid Cleaning Agents for Dairy Industry

NONCORROSIVE acid cleaning agents, having the properties of a detergent, have been in demand by dairymen for some time. Today that demand is rapidly materializing.

The discovery of organic acids with relatively low corrosive powers has made it possible to develop an acidified steam rinse in the cleaning of milk cans. The steam is acidified with gluconic acid through the use of a suction injection. Results have been very satisfactory when the acid cleaning solution is held approximately to a pH of 6.0 to 6.5. The solution should also be sprayed on the surface to be cleaned in the form of a mist in order to obtain the maximum results.

In the past, only alkaline cleaning componds were accepted by the dairy industry. This was true because of their inherent chemical and physical properties. Also, the acid compound used in the past had an inferior detergency, as well as an intense corrosive action upon the metal being washed.

The ever-widening applications of wetting agents and the discovery of their effective combinations with non-corrosive acid reacting solutions indicate that the long sought acid cleaning agents are about to be applied on a large scale.

Another reason that acid cleaning solutions are preferred over alkaline solutions is that the bacteria destroyed by the solution are very undesirable. In fact, this type of bacteria is more undesirable than the type of bacteria destroyed by the use of alkaline cleaning agents. Also, acid cleaning compounds tend to eliminate prevailing milkstone deposits on the inside of milk cans.

One of the primary factors in obtaining the desired results in washing dairy cans is to have satisfactory washing equipment. This is definitely in the state of coming into being. There has been much improvement in can washing during recent years that is essentially the result of good engineering and hydraulics. In order that the recently discovered acid cleaning solution may exert its maximum powers as a cleaning agent, good washing equipment is necessary.

Digest from an article presented at the 36th Annual Meeting of the American Dairy Science Association, Burlington, Vt., June 23 to 26, 1941, by M. E. Parker and G. W. Shadwick, Jr.

## FATS & OILS

### How to Remove Gossypol From Solvent-extracted Cottonseed Oil

SOLVENT extraction of oils from seed meal is successfully practiced in Europe and is being introduced in America for soybean oil, but has not yet been successfully applied to cottonseed oil in this country. Pressing leaves about 6 percent oil, on the average, in cottonseed cake, or more than 3 times the residual oil left by efficient solvent extraction. The presence of gossypol in cottonseed complicates the problem since gossypol is toxic and must be removed. In making pressed oil this tonic compound is detoxified by the cooking treatment which increases the yield and quality of the oil.

Petroleum ether or hexane would be an efficient and relatively cheap solvent but the gossypol would have to be detoxified by a separate operation

IN FLOUR MILL buildings of all types, housing from one to three milling units of widely-varying capacities and utilizing equipment made by many different manufacturers, the MACHINERY PIPING SYSTEM (MPS), plus liquid hydrocyanic acid (HCN) applied by Industrial Fumigation Engineers (IFE), "adds up" to economical, rapid, practically 100% extermination of insect pests in all stages of their life cycles.

The MACHINERY PIPING SYSTEM is POSITIVE. It was developed to utilize most effectively, yet safely, one of the most potent fumigants. Liquid HCN is high-pressured throughout an all-inclusive system of copper tubing, bronze fittings and bronze, dustproof nozzles. Thus, heavy concentrations of gas penetrate ALMOST INSTANTANEOUSLY into every part of the milling equipment. The effectiveness of the method obviates extensive clean-up.

A competent Industrial Fumigation Engineer will be glad to survey your mill and determine the cost "per barrel of yearly production" for an ADEQUATE FUMIGATION PROGRAM.

The production capacity now being served by the FLOUR MILL MACHINERY PIPING SYSTEM already totals more than 75,000 barrels of flour per day. The list, which includes some of the industry's finest and largest mills, is available to interested mill executives.

**Economical and adequate control of insect pests in any mill can best be maintained by fumigation of *all* its equipment at *the same time*.**

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since petroleum hydrocarbon solvents would leave it in the seed cake which would therefore be unsuitable for stock feeds. Results of experimental detoxification by cooking are reported, with emphasis on the fact that cooking causes only a slight yield loss. Another possibility would be a 2-stage extraction in which the second stage would be extraction of gossypol from the seed cake with a solvent such as ether. This would have the advantage of conserving the enzymes and proteins which are altered or destroyed by cooking and which offer opportunities for valuable byproduct recovery from extracted seed cake.

Digest from "Solvent Extraction of Cottonseed Oil," by H. S. Olcott, *Industrial and Engineering Chemistry*, Vol. 33, 611, 1941.

# VITAMINS

## Vitamin D in Milk

MILK normally contains from 20 to 30 U.S.P. units of vitamin D per quart. The amount will vary, depending on the kind of feed, percent of fat in the milk, period of lactation (colustrum milk is higher), sunshine, etc. Artificial irradiation of cows increases vitamin D in the milk but is uneconomical. There are several varieties of vitamin D from a chemical standpoint. In milk it is mainly $D_2$ and $D_3$, with possibly $D_4$ and $D_5$.

The vitamin D content of milk can be increased by feeding the cows irradiated yeast, viosterol, cod liver oil extract, or cocoa shell which has been exposed to sunshine and subsequently yeast-fermented. Yeast is more efficient than viosterol, while cod liver oil decreases milk-fat production. Good-producing cows transfer more of the vitamin D fed to them into the milk than other cows, but only 2 to 3 percent of the amount fed to them gets into the milk.

Commercially, vitamin D milk is also produced by adding concentrates to the milk or by irradiation. Concentrates may be from fish liver oils or from activated ergosterol, dispersed in milk or vegetable oil. They will average 4,000 units per milliliter, so that one milliliter (about 1/30 oz.) added to ten quarts, or about one-hundredth of one percent, will add 400 units per quart of milk. Irradiation consists in exposing thin flowing films of milk to ultraviolet light (2300-3100 Angstrom units) from carbon-arc or quartz mercury-vapor lamps. Modern equipment will handle up to 15,000 lb. or more per hour at potencies of 135 to 400 units per quart. Overirradiation leads to "sunshine" flavor, due to action of

the rays on the milk proteins. Vitamin D is stable and sterilization of evaporated milk or drying of irradiated fluid milk does not affect it. No simple chemical means are yet available for determining D and a bio-assay with rats is necessary.

Digest from "Vitamin D in Milk—A Review," by K. G. Weckel, *Journal of Dairy Science*, Vol. 24, 445, 1941.

## Food Fortification and Restoration

THERE are dangers in haphazard fortification of foods with vitamins and minerals, especially if fortification is carried above natural levels. Multiple corrections of the diet are likely to follow such a practice, leading to excessive use of corrective factors.

If vitaminization is limited to restoration of values lost in processing the food, industry can follow a systematic program of repairing damage incurred in processing of foods, e.g., in milling, canning, baking, extracting and refining. Refined sugar, which makes up about 20 percent of the calories in the American diet, is practically vitamin-free. However, information is lacking as to the vitamins naturally occurring in sugar beets and cane. It seems probable that thiamin deficiency will be a threat as long as this large carbohydrate intake is left barren. Vitamin restoration in large-tonnage products, such as sugar and flour, would also involve serious problems in manufacture and control. Stability in storage may be affected. Constant analytical control would be required.

Some of the needed vitamins are not yet available in large quantities, and production problems would be encountered. The principal vitamin losses in processing of foods result from inactivation by heat, or from direct vitamin loss in milling cereals and in discarding soluble vitamins in wash waters or cooking liquors which leach out water-soluble vitamins and minerals. Restoration of these losses would be a great improvement in the diet.

Digest from "Fortification and Restoration of Processed Foods," by R. R. Williams, *Industrial and Engineering Chemistry* Vol. 33, 718, 1941.

# SUGAR

## Sugars in Sweet Pickles

SUGAR penetration in pickles is governed by the amount of acid, the amount of dextrose and sucrose, and also the time and sequence of adding these to the sweetening solution.

Penetration proved to be fastest in the absence of acid, and slowest in simultaneous souring and sweetening, a method which also causes greatest shrinkage. Souring to a 40- or 20-grain acid gives slightly faster penetration.

Dextrose shows uniformly faster penetration than sucrose, and sucrose also causes more shrinkage. Adding dextrose to sucrose reduces shrinkage.

When dextrose and sucrose are mixed before being added to the solution, there is more shrinkage than when they are added separately. When sucrose is added first and dextrose last there is more shrinkage at first, but the added dextrose counteracts it. When dextrose is added first there is less shrinkage at first but more after sucrose is added.

Digest from "Experimental Work on Processing and Finishing of Sweet Pickles, III. Use of Dextrose and Sucrose in Manufacture of Sweet Pickles," by F. W. Fabian and R. G. Switzer, *Proceedings of the First Food Conference*, Institute of Food Technologists, 1940, p. 320.

# FROZEN FOODS

## Bacterial Death Rates In Frozen Egg Products

SALT and low temperatures together exert a bactericidal effect in frozen egg products. For example, the bacterial count in salted yolks stored 33 days at 10.4 deg. F. dropped from nearly 3,000 to 3 per gram. These yolks contained 10 percent of added salt. Again, salted whole eggs (14 percent added salt) stored 82 days showed more than 90 percent decrease in bacterial count. After thawing, the low bacterial count continued for a short time before growth was resumed.

In further tests with salted yolks, the average drop in bacterial count was 96 percent in storage periods from 4 to 7 weeks. Tests with highly contaminated eggs gave about the same percentage drop as the eggs mentioned above. With 10 percent of added sugar, instead of salt, bacterial growth continues through the mixing period and to some extent through the freezing operation.

However, experiments show that there is a gradual drop during the period of storage.

Bacteria which grow best at 68 deg. F. are least affected in frozen storage. Of the organisms which grow at 98.6 deg. F. those of the coli-aerogenes group suffer the fastest drop in viability in frozen storage.

Digest from "Observations on Death Rates for Bacterial Flora of Frozen Egg Products," by F. A. Nielsen and G. F. Garnatz, *Proceedings of the First Food Conference*, Institute of Food Technologists, 1940, p. 289.

Send for this complete Colson caster catalog. It will simplify your selection of casters for any equipment

FROM the smallest to the largest, Colson casters are built to *quality* standards. Because casters are not costly—it pays you to buy the best. You'll find Colson casters will serve you long—roll easily—and pay you well wherever a caster is needed. Make your selection from the Colson Caster Buyiny Guide—mailed on request.

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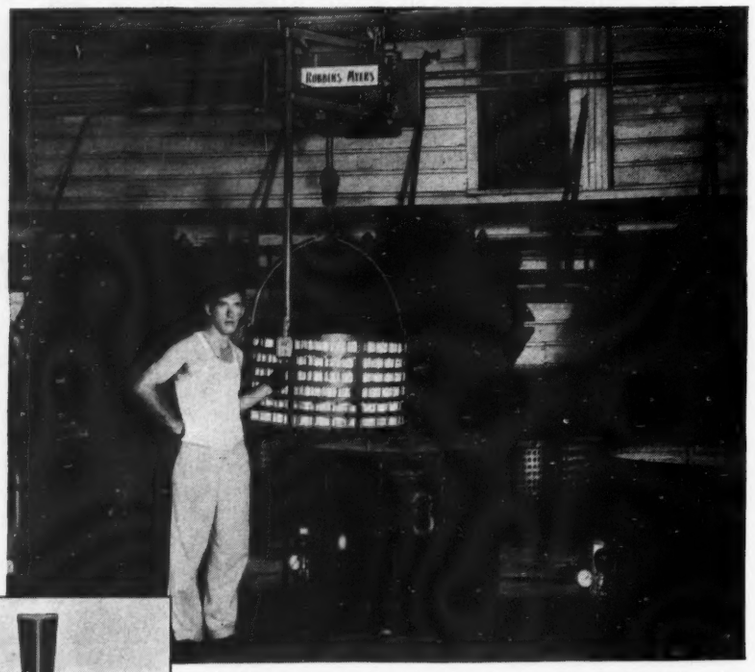
# *Handle the New Pack Faster*

# WITH R & M HOISTS




The Oconomowoc Canning Co. plant at Sun Prairie, Wis., depends on R & M hoists to handle more than 300,000 cases of peas per season at the rate of 1,000 cases per hour. Above is shown a new R & M hoist recently installed to speed the packing of this year's crop. Two R & M hoists are also on the job at the firm's Oconomowoc, Wis., plant and Poynette, Wis., branch.

Here's the fast, sure-running, precision-built R & M hoist used by canners everywhere. It is push-button controlled, has a capacity of 1,000 lbs. and a hoisting speed of 54 feet per minute. Frame is built of welded steel.

Short season, perishable foods, day-and-night rush when the crop's moving—that's where *reliable* equipment pays double. No wonder so many canners use the hoist that's *dependable*, powerful and nimble—an R & M.

At peak schedules or steady, year-round production, R & M hoists keep handling costs down to a minimum, speed output, improve labor efficiency. There are 2,000 models, all built to quality standards, from which you can choose now to fit the job in *your* plant.

It will pay you to "take it up" with R & M. Get in touch now with the nearest R & M sales and service office listed in your telephone directory or the following canning machinery manufacturers who handle R & M hoists:

Berlin Chapman Co.....Berlin, Wis.
Chisholm-Ryder Co...Niagara Falls, N. Y.
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## MISCELLANEOUS

### Bacteriology of Nut Meats

BACTERIOLOGICAL examination of 224 samples of peanuts, pecans, almonds, Brazil, hazel, cashew and mixed nuts (bulk and packaged) showed wide variability. The method of handling is an influential factor. Pecans were most variable, some showing very high counts. Nuts in transparent cellulose bags were more sanitary than bulk products. Mixed nuts showed higher counts than peanuts or cashew nuts.

The commonest organisms were aerobic spore-forming rods. Seven of the 224 samples (3.12 percent) gave cultures of *Escherichia coli*, sometimes taken as a criterion of sanitary condition. Staphylococci were present in 54 samples (24 percent), a fact which may be significant since some of the staphylococci are sources of food poisoning. Survival time in artificially contaminated nut meats at room temperature was 3 to 4 weeks for *Eberthella typhosa*, 5 weeks for *Escherichia coli* and 9 to 10 weeks for *Staphylococcus aureus*.

Digest from "Bacteriology of Nut Meats," by F. M. Clark and B. H. Booth, *Proceedings of the First Food Conference*, Institute of Food Technologists, 1940, p. 295.

### Aluminum Substitutes

SUBSTITUTES that might be used to conserve the supply of aluminum for defense use and essential civilian products have been suggested to the OPM in a preliminary report from an advisory group of the National Academy of Sciences.

The report cautioned that generalities with respect to substitutions were hazardous and emphasized that the suggestions must be taken only as guides.

Substitutions for existing aluminum uses should generally come from materials not at present subject to priorities.

The known substitutes for aluminum are, in general, those materials that were originally replaced by aluminum. Such materials as brass, zinc and chromium for crome plating, as well as nickel for nickel plating, are themselves so scarce as to be questionable present-day substitutes.

Aluminum foil in many of its uses can be replaced by oiled paper, glassine, tin foil, lead foil or transparent cellulose. These substitutes will not be as satisfactory as aluminum foil but may be improved sufficiently to meet commercial conditions temporarily.

Bottles (including milk) caps that

have been made of aluminum may be replaced by paper or by some form of sheet steel properly protected by paint or plastics, or plastics alone.

Cooking utensils may be replaced by some form of sheet steel (with or without enamel), with some form of plastic application (as for example, for handles), with cast iron, glass or pottery.

In general, it may be stated that under existing conditions plastics alone, cast iron, steel (with or without combination with plastics), wood, paper, glass and ceramics may be substituted for aluminum where it is absolutely essential to make a substitution.

Digest from "Substitutes for Aluminum Outlined as Conservation Aid to Defense," *Defense Bulletin*, April 15, 1941, p. 20.

## Cowpea Starch Has Special Properties

THE COWPEA (*Vigna catjang*) is an important food crop in India. Analysis of seeds from the long-padded variety showed 39.2 percent starch and 11.12 percent soluble carbohydrate. A laboratory and semi-commercial method similar to that employed in producing cereal starches was applied to this variety of cowpea. The yields were 20 percent of white starch (starch 87.3, moisture 12.02, ash 0.14 percent) and 74.4 percent of pulp (protein 36.22, crude fiber 23.12, starch 27.55, moisture 8.17, ash 4.4 percent).

The viscosity of a 3 percent paste of cowpea starch, heated at 90 deg. C., was initially somewhat higher than that of wheat starch and lower than that of corn starch, but both cereal starches decreased in viscosity as heating continued, so that in 30 minutes the cowpea starch paste had the highest viscosity of the three. Gelatinization, as measured by the point at which maximum viscosity is reached in a constantly agitated 3 percent paste, is slower in cowpea starch than in cereal starches. Because of its relatively small viscosity variation over a wide temperature range cowpea starch (or the cowpea) should be useful in textile sizing. In actual trials cowpeas proved effective as a thickener in calico printing.

Digest from "Starch From the Cowpea," by J. L. Sarin and M. H. Qureshi, *Industrial and Engineering Chemistry*, Vol. 33, 640, 1941.

## Physical Nature of Starch

WHEN STARCH is peptized by alkali or by any other peptizing agent, and the agent is removed, the starch is precipitated as a mushy paste. This reversion of peptized starch to a less soluble state is called retrogradation. It is faster and more complete at low than at high temperatures. Skinning of boiled starch paste by evaporation is a case of surface retrogradation. Autoclaved starch solutions retrograde on standing, and retrogradation is faster the higher the starch concentration. Alkali-peptized starch does not retrograde on standing, nor by freezing or evaporation.

Precipitation of starch from pastes or solutions involves retrogradation, and the precipitated starch will not dissolve to its former degree of dispersion, even after being autoclaved. High acidity favors retrogradation, but when acidity is high enough (pH less than 3) hydrolysis of the starch lessens the quantity of precipitate by forming soluble products. Starches which have been solubilized by dextrinization, oxidation or ethylation do not retrograde readily. They do not skin easily and if a skin does form it can be redissolved.

These and other aspects of starch behavior indicate that the affinity of starch for water is opposed by the stronger association forces acting between starch molecules. Hydration, therefore, can be carried past the gel stage to the colloidal solution stage only with extreme difficulty, and such a colloidal solution retrogrades easily. A dissociating force stronger than that of water is needed to solubilize starch.

Digest from "Physical Aspects of Starch Behavior," by Thomas J. Schoch, *Cereal Chemistry* Vol. 18, 121, 1941.


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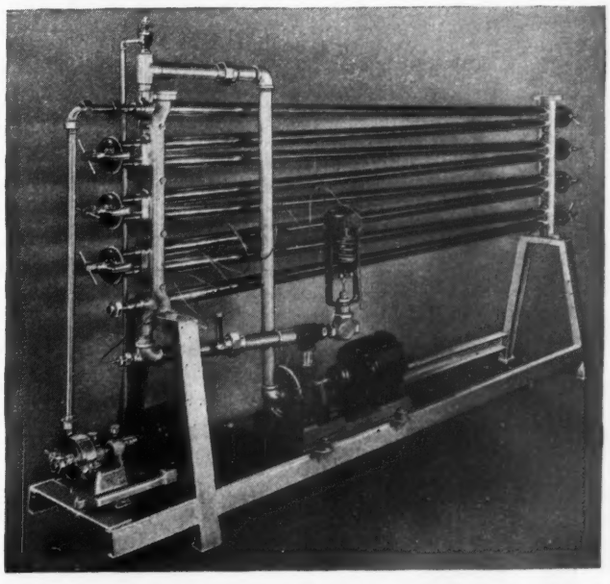

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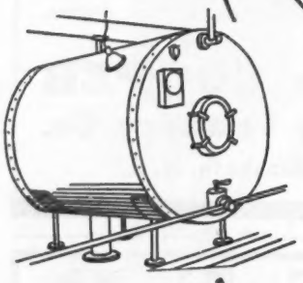

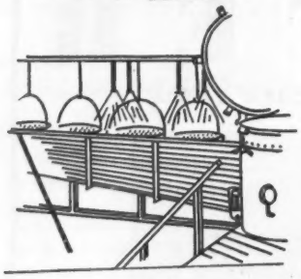

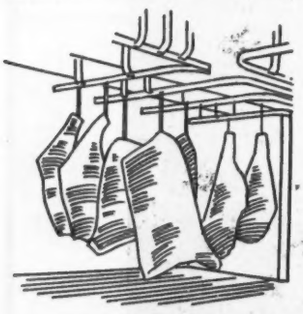

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## Tin Supplies

*(Continued from page 50)*

tin mines falling into enemy hands.

Nearly half this Straits tin output is obtained by dredges. This ore is smelted in Malaya and is 99.9 percent pure.

### *Bolivian Ore Not So Rich*

In South America, the position of the ore renders it necessary to tunnel into the sides of the Andes mountains for it, chiefly at the Patino and Enterprises Consolidated, Inc., mines in Bolivia. Here the concentration of tin in the ore is only 60 percent, and even less, and the ore has to be transported to the Chile coast for export.

In Nigeria the ore is obtained out of the mountain gravels by dredges, hydraulic elevators, centrifugal gravel pumps and dragline bucket elevators with power from local hydroelectric power plants. The tin content of African ore is higher than that of South American—averaging over 70 percent. It is not at present smelted in Nigeria.

American industry uses about 75,000 tons of tin per year, mainly from Malaya, and Britain about 35,000 tons, mainly from Nigeria and Bolivia. Thus the British Empire can meet the tin needs of the two great democracies, providing transport is available, and her allies and neutral countries can make up the balance required for war purposes, thus "cornering" the market. Britain is, of course, in a position to export tin plate.

### *Old Cans Salvaged*

The salvage of old cans is now an important branch of the tin plate industry, but the cans must be baled and compressed before puddled in the blast furnace, or dangerous voids are caused in the puddled mass.

The British tin-plate industry continues to improve and develop despite wartime handicaps, for here, as in South Africa and elsewhere, the canning industry is urgently being expanded as a means of storing food. Metal cans are a safeguard against war gases in a gas attack.

The British canning industry increased its consumption of tin plate in 1940 by over 53 percent, with a record pack of 1,660,000,000 cans. But the British Ministry of Supply stated in February, 1941, that tin plate production will have to be progressively reduced to 25 percent below recent figures. This would chiefly affect the export business, for the Ministry recently ordered 250,000 cans of soup for emergency use, and reserve stocks of up to 600,000 cans for vulnerable areas. THE END.

## Pectin Decomposition

(*Continued from page 46*)

the strength of jellies dropped off very rapidly; and, in the second case, where inversion was supposed to precede evaporation, the jellies had a more uniform strength, it was considered that perhaps complete solution of the sugar rather than inversion was important in preparing cranberry sauce in order to improve its quality.

### *Factors in Pre-cook Mixing*

Careful stirring or mixing for two minutes improved the strength of jelly by about 20 percent over that of jellies prepared by dumping sugar and juice together and heating before mixing takes place. With increase in mixing temperature there was a definite decrease in strength. When a prepared invert sirup was used to replace part of the cane sugar, the strength decreased slightly as more invert sugar was added. The pH of the jellies to which invert sugar was added varied slightly from that of the others despite an attempt at careful adjustment. None of the jellies equaled in high strength or low syneresis value the jellies made from the cold mix which had been carefully stirred. *The value of thorough, mechanical, pre-cook mixing under industrial conditions is indicated.* It is essential to remove any possibility of incomplete solution of sugar which may cause local precipitation of cranberry pectin and consequently loss of jelly strength.

### *Effect of Aging*

The cranberry produces a slow-set jelly. Actual setting time for jellies of preferred commercial strength values will approximate one and one-half hours. It was found that jellies increased in strength by as much as 50 percent during the first week of storage at 80 deg. F. Syneresis values remained constant with aging, varying slightly with the variety of berry. As indicated in Fig. 2, an increase in invert sugar occurs as aging takes place. This cannot be considered to have any influence on jelly values.

### *Conclusion*

It would appear from this summary that the inversion of sugar deserves no consideration in cranberry sauce manufacture. Hydrolysis of pectin should not be confused with inversion (hydrolysis) of sugar. If strength and low syneresis values are to be maintained in cranberry sauce jellies, every consideration should be given the prevention of hydrolysis (decomposition) of pectin. Any prolonged period at temperatures above 180 deg. F. should be avoided.

The careful control of extraction conditions in order to preserve pectin values as indicated by viscosity is undoubtedly more important than any regulation of the jelly-cook in cranberry cause manufacture.

THE END

## Ice Cream Sales

(*Continued from page 54*)

income less than $500 (the lowest income group) were more than half those purchased by the "base families." As receipts increased from $1,200 to $5,000, quantities purchased decreased some 40 percent. Families with over $5,000 annually (the highest income group) purchased less evaporated milk than those in the lowest income group.

Income affects butter sales in a distinctly different manner. Families at the "base" level purchase slightly over twice as much butter as those in the lowest income group. Those earning the most consume only 41.8 percent more than the "base families." As compared with ice cream, a relatively large change in family annual income causes a relatively small change in butter purchases.

Sales of ice cream are more responsive to income than those of most other dairy products. The "base families" purchase five times more ice cream than do those in the lowest income level. As earnings rise from $1,200 to $1,750, ice cream purchases increase 25 percent. Purchases of families having the highest annual income are more than twice those of the "base families." As compared with butter, a relatively small change in annual family income causes a relatively large change in ice cream consumption.

Regular temperature fluctuations, occurring during the year, naturally cause seasonal changes in ice cream consumption. No authentic data measuring these variations are available. Since production data can be considered as showing consumption of commercial ice cream rather accurately, monthly variations in production of factory ice cream, based on various reports of the Bureau of Agricultural Economics of the U.S.D.A. and the Federal Reserve Board, have been investigated to determine the seasonal variations in ice cream consumption. The investigation, summarized in Fig. 2, indicates a gradual shift in ice cream eating habits of American urban consumers.

Monthly production has been calculated as percentage of annual production in three different periods: an early one, from 1919 up to and including 1921; a middle one, from 1930 through 1933; and a recent one, from 1937 through 1939.

In recent years, winter sales of ice cream have been increasing, so that summer purchases represent less of the year's total consumption. Forty-seven percent of the average annual production of the first period was during June, July and August. During the summer of the second and third periods, respectively, 43 and 40 percent of the annual production were manufactured. Proportionately little ice cream was purchased during the winter of the early twenties; consumption was primarily confined to the summer. Consumption in July (the highest month) was 5½ times greater than in December. Twenty-one and one-half percent of the annual production was in the cooler half of the year from October through March. July production was 3½ times larger than that in December (the lowest month) in the recent period, and approximately 31 percent of the annual production was in the cooler half of the year.

Ice cream production has become more uniform throughout the year. Education, promotion and advertising stressing the food value and desirability of ice cream in the diet, regardless of the season, may have caused a gradual shift in ice cream eating habits. Further uniformity in monthly takings of ice cream may be brought about by greater support of organized educational and promotional work on the part of the industry.

Yearly and monthly changes are not the only ones in ice cream consumption. There are also day-to-day changes. The daily variations in ice cream sales were reported on the basis of an extensive study in a 1932 Cornell University bulletin.[3] Daily sales of ice cream, computed as percentages of the total weekly sales, are shown below, taken from the Cornell bulletin.

| Day of the week | Percent of average |
|---|---|
| Sunday | 122.7 |
| Monday | 105.5 |
| Tuesday | 86.2 |
| Wednesday | 87.3 |
| Thursday | 86.4 |
| Friday | 87.4 |
| Saturday | 124.6 |

In addition to the regular changes in consumption of factory-produced ice cream there are irregular, short time fluctuations caused by abrupt changes in temperature. These are most common during the fall and spring.

#### References

1. E. E. Vial, Ice Cream Consumption and Consumers' Purchasing Power, *The Dairy Situation*, Bureau of Agricultural Economics, U.S.D.A., July, 1940, p. 9.

2. Milo Perkins, The Challenge of Underconsumption, Federal Surplus Commodity Corp. U.S.D.A., February, 1940.

3. M. B. Bond, The Marketing of Milk Through Ice Cream, Cornell University Agricultural Experiment Station *Bulletin* 546, December, 1932.

THE END

# BOOKS

## Insight to Sound Finance

APPLIED BUSINESS FINANCE. By Edmond E. Lincoln. Published by McGraw-Hill Book Co., 330 West 42d St., New York, N. Y. 1941. 930 pages; 6½x9¼ in.; cloth. Price, $4.50.

Every executive and would-be executive in the food industries could spend some time profitably in an easy chair with his pipe and this book. This is true not alone because experience-proved business policies and practices are outlined, but because of the great wealth of information on the history of business successes and failures and the tremendous amount of statistics pointing the finger to significant trends in American business. There are no less than 248 tables, each of which tells a story. The author has done an effective job of telling what is going on, and why, in the business world, and he has backed up his statements with data which prove them.

One who knows nothing about business practices and policies can learn much from the book. As can most experienced and successful business men. For, as the author points out, many a successful business executive, including even one-time "geniuses," have wrecked their enterprises and lost their prestige because they violated one or more fundamental principles of sound business finance.

Now in its fifth edition, this work has been revised and enlarged. The first edition developed out of a pioneering course given by the author as required work to all students of the Harvard Graduate School of Business Administration some 20 years ago. In presenting the material, the author is primarily concerned with policies and principles of long run significance. And the everyday problems of business are discussed, rather than the unusual and spectacular. The purpose is to stress those problems common to all industrial concerns, both manufacturing and selling, with particular reference to enterprises of moderate size. The aim is to show how financial difficulties can be measurably avoided and to help keep the patient well, rather than merely discuss the "diseases" resulting from bad management.

Most mistakes in financial management, the author points out, probably arise from poor judgment or from failure to guess the future far enough ahead to enable management to ride with the trends instead of bucking them. Poor judgment may arise from lack of adequate historical background. Failure to guess the future may come from ignorance as to current trends. This book helps to remove from the mind of the reader those two primary causes for failure.

## Corrosiveness of Cleaners

THE CORROSIVE EFFECT OF CHLORINE AND LYE SOLUTIONS ON METALS USED IN DAIRY EQUIPMENT. By H. S. Haller, F. M. Grant and C. J. Babcock. Published by U. S. Department of Agriculture as Technical Bulletin No. 756, January 1941. 28 pages; 5¾x9⅛; paper. Price, 5 cents; for sale by the Superintendent of Documents, Washington, D. C.

Results are given for the effect that three types of chlorine solutions have upon the weights of 14 different metals and alloys under various conditions. The tarnishing effect on the metal strips is also included. Data are given on the dissipation or losses in strength of the chlorine solutions, when stored under various conditions, when in contact with the metals during the corrosion experiments and when used as a sanitary wash for udders.

The resistance to corrosion on 14 different metals by lye solutions is given for three different strengths of sodium hydroxide.

## Help on Industrial Health

INDUSTRIAL HEALTH PRACTICES. Report of a Survey of 2,064 Industrial Establishments. Issued by National Association of Manufacturers, 14 West 49 St. New York, N. Y., 1941. 76 pages; 6x8¼ in.; paper. Price, $0.50. (Free to NAM members.)

Of special significance in the present emergency is this industrial health report based on surveys in over 2,000 plants employing 2,000,000 workers. Accident-prevention and health-program work by both industrial leaders and the medical profession has progressed rapidly in recent years, with 43 percent of the plants reporting that they had established health services within the past decade.

Physical-examination policies, insurance premiums and factory health programs of these companies, with complete tables and classifications, are particularly interesting.

Much valuable information regarding the value, and cost of health programs is revealed in the study.


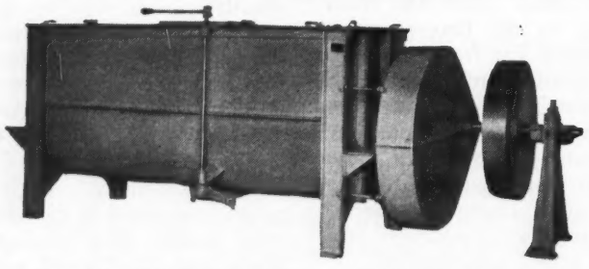

Figure 690.—TROWEL TYPE MIXER—BELT OR MOTOR DRIVEN

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# PATENTS

**Vitamin $B_1$ Content of Yeast Increased by Placing Yeast in Water Extract of Rice Polish and Rice Bran for Period of 15 to 60 Min.**—Alfred S. Schultz, Bronx, N. Y., to Standard Brands, Inc., New York, N. Y. No. 2,243,129. May 27, 1941.

**Hop Extract Obtained by Using Isopropanol as Solvent**—Lyndon D. Wood to National Hops Laboratories, Inc., Chicago, Ill. No. 2,243,143. May 27, 1941.

**Sugar Moistened With Solution of Potassium Phosphate and Sprinkled With Powdered Organic Minerals Normally Present in Sugar Beets**—Volkmar Klopfer, Dresden, Germany. No. 2,243,381. May 27, 1941.

**Sparkling Beverage Made From Outer Portions of Rice Grains Containing Fat, Proteins and Inorganic Substances Not Desired in Sake Brewing**—Katsuichiro Takakishi, Honolulu, Hawaii. No. 2,243,513. May 27, 1941.

**Cherries Pitted and Stemmed by Mechanical Means**—Albert Kok, San Jose, Calif. No. 2,243,530. May 27, 1941.

**Liquids Sterilized at Temperatures Below 80 Deg. C. by Passage Between Surfaces of Two Closely Spaced Concentric Tubes Made From Different Metals**—Wincenty Matzka, Grasse, France. No. 2,243,761. May 27, 1941.

**Bakery Products Made to Have as Dough Ingredient Ether Extractive of Egg Yolk Containing Egg Fat and Yolk-Lecitho-Vitellin in Relatively Pure State**—Jacob Freilich, New York, and Charles N. Frey, Scarsdale, N. Y., to Standard Brands, New York, N. Y. No. 2,243,860. June 3, 1941.

**Egg Product Made to Contain Proportion of Reaction Product Between Metaphosphoric Acid and Polyhydroxy Alcohol Derivative**—Morris Katzman, to The Emulsol Corp., Chicago, Ill. No. 2,243,867. June 3, 1941.

**Angel-food Type of Cake Made to Have as Ingredient Reaction Product of Metaphosphoric Acid With an Alcohol Containing at Least Four Carbon Atoms**—Morris Katzman, to The Emulsol Corp., Chicago, Ill. No. 2,243,868. June 3, 1941.

**Doughnut Machine Made to Have a Plural Number of Laterally Spaced Dough Dispensing and Forming Devices**—David A. Sandin, St. Paul, Minn. No. 2,244,854. June 10, 1941.

**Yeast Propagated in Continuous Manner as Mash is Made to Flow Downwardly and Upwardly in Predetermined Path While Fresh Air and Seed Yeast are Introduced Into Liquid Under Its Level**—Eugen Stitch, Mannheim, Germany. No. 2,244,902. June 10, 1941.

**Ice Cream Cones Centered, Filled and Mechanically Held in Place in Basket For Inverted Dipping**—Edwin L. Elwell, Baltimore, Md., to Eskimo Pie Corp., Bloomfield, N. J. No. 2,245,071. June 10, 1941.

**Mayonnaise and Similar Emulsion Products Made in Continuous Manner on Modified Colloid Mill**—William A. McLean, to Geneva Processes, Inc., Geneva, N. Y. Nos. 2,245,112 and 2,248,886. June 10, and July 8, 1941.

**Dough Rounder Surfaces Dried With Air Blast to Prevent Sticking of Dough**—Wilbur Lockwood, Indianapolis, Ind. No. 2,245,284. June 10, 1941.

**Starch Conversion Sirup Product Changed From Liquid to Solidified Mass by Cooling from 135 Deg. C. to 5 Deg. C. in Direct Contact With Water**—James F. Walsh, Yonkers, N. Y., to American Maize-Products Co. No. 2,245,309. June 10, 1941.

**Fish Eviscerated, Slitted and Cleaned in Continuous Manner by Mechanical Means**—Paul Danielsson, to Aktiebolaget Gerh. Arehns Mekaniska Verkstad, Stockholm, Sweden. No. 2,245,329. June 10, 1941.

**Fish Beheaded and Made Ready for Further Dressing Treatment in Continuous Manner by Mechanical Means**—Paul Danielsson, to Aktiebolaget Gerh. Arehns Mekanska Verkstad, Stockholm, Sweden. No. 2,245,330. June 10, 1941.

**Vitamin $D_2$ Concentrate Made by Dispersing Butter Fat Containing Activated Ergosterol in Evaporated Milk Prior to Canning and Sterilizing**—Reginald C. Sherwood, St. Paul, and Charles G. Ferrari, Minneapolis, Minn., to General Mills, Inc. No. 2,245,418. June 10, 1941.

**Ice Creams, Fluid Custards and the Like Frozen in Continuous Manner**—Charles Erickson and Erick Spellman, New York, N. Y. Reissue No. 21,827. June 17, 1941.

**Milk Curd for Cheese Making Containing Only Portion of Whey Run Into Molding Vat Having False Bottom to Withstand Pressure Applied to Surface of Curd for Removal of Remaining Whey and Forming of Plurality of Individual Cheeses of Uniform Dimensions**—Raymond Miollis, Elmwood Park, Ill. Reissue 21,834. June 17, 1941.

**Perishable Foods Protected Against Deterioration by Covering Surfaces With Jelly-Like Coating Containing Bactericidal Pectinate**—Arnold C. Dickinson, Lunenburg, Mass., and Philip Bliss Myers, Scarsdale, N. Y. to Sardik, Inc., Jersey City, N. J. No. 2,245,576. June 17, 1941.

**Meat Animal Carcasses Boned During Rigor Mortis**—Beverly E. Williams and Leon L. Cadwell, to Industrial Patents Corp., Chicago, Ill. No. 2,245,631. June 17, 1941.

**Grains Cleaned and Graded During Passage Over Screen Having Elongated Slots in Direction of Its Longitudinal Movement and Crosswise to Direction of Its Transverse Movement**—Ovie N. Christopherson, Minneapolis, Minn. No. 2,245,650. June 17, 1941.

## *Canadian Patents*

**Bottles Sealed With Cap of Stretched Polyvinyl Acetal Resin Which Shrinks When Warmed**—Bruno von Zychlinski, to Dr. Alexander Wacker, Gesellschaft für Elektrochemische Industrie G.m.b.H., Munich, Germany. No. 395,923. April 15, 1941.

**Baking Quality of Dough Estimated by Determining Ratio of Elastic Modulus to Viscosity Modulus in Samples Having Same Elastic Modulus**—Philip Halton, St. Albans, County of Herts, England. No. 395,949. April 22, 1941.

**Cooked Pancakes Rolled and Packed With Liquid Sauce in Cylindrical Container**—Alphonse Roart, Philadelphia, Pa. No. 395,962. April 22, 1941.

**Flour Settled and Compacted in Bags on Vibrating Table Having Both Vertical and Horizontal Components of Vibration**—Helmer Anderson, to General Mills, Inc., Minneapolis, Minn. No. 396,011. April 22, 1941.

**Coffee Roasted in Partial Vacuum by Light and Heat From Incandescent Electric Light Source in Non-oxidizing Gas Freed From Berries During Heating**—Geo. G. Griffin, Chicago, Ill. No. 396,293. May 6, 1941.

**Sausage Casings Reversed by Securing Side Wall Near Shorter End Against Open Tube and Threading Remainder of Casing Over Itself by Hydraulic Means**—Harry A. Scherubel, to Industrial Patents Corp., Chicago, Ill. No. 396,369. May 6, 1941.

**Frozen Fish Encased in Airtight Noncracking Ice Glaze Containing an Edible Solute to Lower Freezing Point**—Harry R. Beard, Vancouver, and C. A. Hedreen, Seattle, Wash., to Canadian Fishing Co., Ltd., Vancouver, B. C. No. 396,434. May 6, 1941.

**Pastry Cloths Made With Collapsible Frame to Aid Movement From Place to Place in Bakeshop Makeup Department**—Ebenhard S. Gandrud, Owatonna, Minn. No. 396,456. May 13, 1941.

**Coconut Mass First Dried in a Container Under Air Pressure; then in Same Container Not Under Pressure**—Archie Stirling Glen, Sydney, New South Wales. No. 396,457. May 13, 1941.


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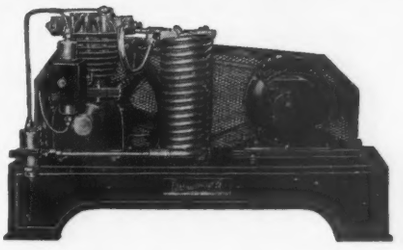

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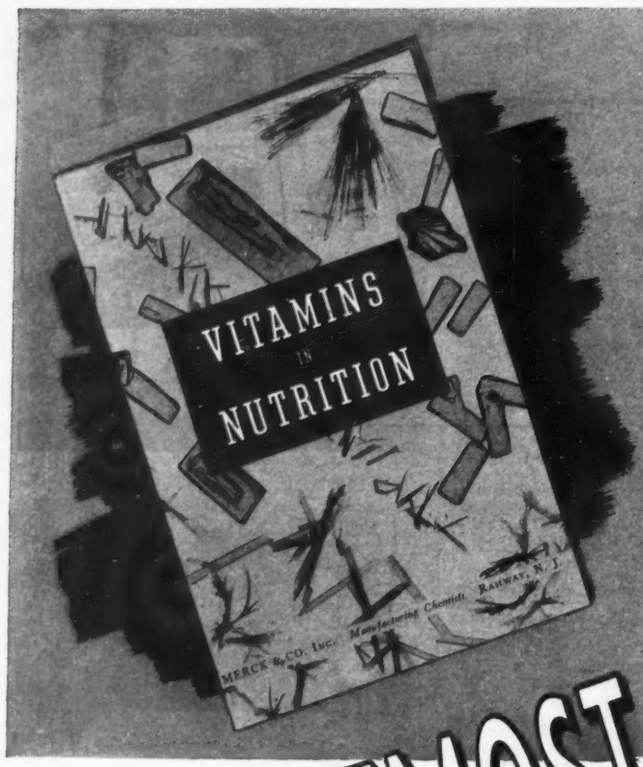


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## in the Synthesis and Production of Pure Vitamins

Discoveries and advances in the vitamin field made by Merck chemists and their collaborators have continually emphasized the outstanding rôle played by Merck & Co. Inc. in the development of these vitally important substances.

The following chronologic review briefly describes the contributions of Merck & Co. Inc. in making available many of these essential factors in pure form:

**1934** *Ascorbic Acid Merck (U.S.P.) was made available by Merck & Co. Inc.*

**1936** *Vitamin $B_1$ was synthesized in the Merck Research Laboratories.*

**1937** *Vitamin $B_1$ Merck (Thiamine Hydrochloride U.S.P.) was made available in commercial quantities.*

**1938** *Nicotinic Acid Merck (U.S.P.) became commercially available.*

**1938** *Vitamin $B_2$ Merck (Riboflavin) was the second pure crystalline vitamin to reach commercial production during that year.*

**1938** *Alpha-Tocopherol (Vitamin E) was identified and synthesized by Merck chemists and their collaborators in other laboratories.*

**1939** *Vitamin $B_6$ was synthesized in the Merck Research Laboratories.*

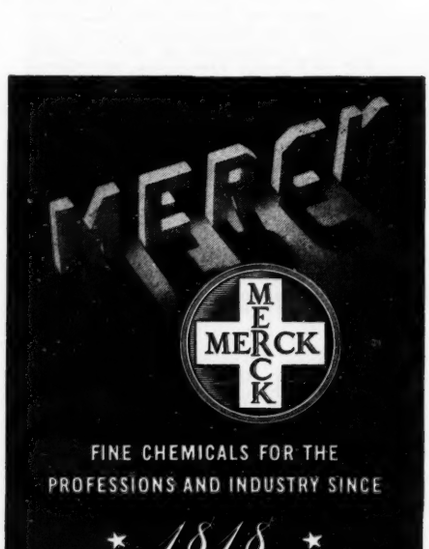
**1940** *Vitamin $B_6$ Hydrochloride Merck became available in commercial quantities.*

**1940** *Alpha-Tocopherol Merck (Vitamin E) was made commercially available.*

**1940** *2-Methyl-Naphthoquinone Merck, a pure chemical having marked Vitamin K activity, became available in commercial quantities.*

**1940** *Pantothenic Acid, the most recently synthesized member of the Vitamin B Complex, was identified and synthesized by Merck chemists and their collaborators.*

**1940** *Calcium Pantothenate Dextrorotatory, a physiologically active form of Pantothenic Acid, was made commercially available by Merck & Co. Inc.*




MERCK & CO. Inc. *Manufacturing Chemists* RAHWAY, N. J.

NEW YORK • PHILADELPHIA • ST. LOUIS • *In Canada:* MERCK & CO. Ltd., Montreal and Toronto

# FORMULAS FOR FOODS

FORMULA NO. 209

## Soy Noodles

| | |
|---|---|
| Flour, spring wheat | 117 lb. |
| Soy flour, full fat | 13 lb. |
| Whole eggs | 24 lb. |
| Water | 24 lb. |
| Yield, dry noodles | 135 lb. |

Mix soy flour with wheat flour, then proceed as with regular noodles.

Formula from A. E. Staley Manufacturing Co.

FORMULA NO. 210

## Southern Loaf

| | |
|---|---|
| Veal trimmings | 40 lb. |
| Beef trimmings | 20 lb. |
| Pork trimmings | 20 lb. |
| Bull meat | 20 lb. |
| Dry milk solids | 12 lb. |
| Queen olives | 4 lb. |
| Pimientos | 6 lb. |
| Red pepper | 5 oz. |
| Allspice | 2 oz. |
| Ground mustard | 3 oz. |
| Cinnamon | 2 oz. |
| Salt | 3 lb. |
| Quick cure. (See Formula No. 23) | 1 qt. |

Grind and chop the usual way, adding ice, cure, dry milk and seasoning while chopping. Then place in mixer and add whole olives and pimientos cut into suitable size. Mix well. Place in greased pans and bake at 200 to 250 deg. F. for 2½ to 3 hours, depending on size of pan.

When cool can be stuffed in amber artificial casings.

*Formula from Dry Milk Institute*

FORMULA NO. 211

## Pilot Bread

| | |
|---|---|
| Flour (straight soft winter) | 196 lb. |
| Salt | 1¼ lb. |
| Lard | 16 lb. |
| Water | 8 gal. |

Dissolve salt in water at 110 deg. F. in summer; 130 deg. F. in winter. Break or beat up lard in the salted water before mixing in the sifted flour.

Much depends on the mixing operation. Finished dough must be free from lumps or layers of unmixed flour. At the same time it must be light, not stringy or soggy.

Sheet or roll to desired thickness with as little working or handling of dough as possible.

Run on a cracker-cutting machine so as to make as little scrap as possible. Scrap dough does not rework very well. Use pilot-bread cutter; either circular with a 5½-in. diameter or rectangular, 2-in. wide by 5 in. long.

Bake in a cracker oven and dry out well during baking. Time of baking, about 5 min. for a 600-deg. F. oven or about 10 min. for a 500-deg. F. oven. Time of baking and temperature of oven will vary according to thickness of bread.

If a tile-bottomed peel oven is available it is preferred. It will make the best pilot bread because the tile is porous and absorbs moisture from the dough to make the bread light and flaky. A soapstone hearth is frequently used and is better than an iron or steel hearth. Oven heat should be "solid," free from "flash" heat.

The quality of the bread varies with the quality of grade of flour used. Also, the quantity of water used will vary with the absorption value of the flour.

Name of bread, too, varies with the quality. Whether known as "hard tack," "navy and ship bread" or "pilot bread," the manner of making is the same; the difference lies largely in grade of flour used.

When taken from oven, the bread should be thoroughly kiln or hot-room dried before packing into large, airtight, tin cans or cases. For quick consumption it may be packed in wooden barrels or corrugated cartons.

Formula from American Institute of Baking

FORMULA NO. 212

## Coconut Oatmeal Cookies

| | |
|---|---|
| Fine granulated sugar | 2 lb. |
| Light brown sugar | 2 lb. |
| Shortening | 2 lb. |
| Salt | ½ oz. |
| Whole eggs | 1 lb. |
| Water | 8 av. oz. |
| Cookie flour | 3 lb. |
| Baking powder | ¾ oz. |
| Oatmeal | 2 lb. 4 oz. |
| Shredded coconut | 2 lb. 4 oz. |

### *Mixing Directions*

Cream sugars, shortening and salt together lightly. Use second speed. Add whole eggs to above mixture in three parts while mixing for 2 minutes on second speed. Add water. Mix just enough to break up mass, using low speed. Sift together the flour and baking powder. Blend this mixture with the oatmeal and coconut by hand. Add to batter in mixer bowl. Use low speed and mix together for about 1 minute.

The above directions apply to a 3-speed machine. On a 4-speed machine, use second and third speeds.

### *Baking Directions*

Use 18x26-in. sheet pans greased with plain shortening. Roll dough a little less than ¼ in. thick. Cut to desired shape and size. Bake for 10 to 12 minutes at 365 to 375 deg. F.

During production avoid overmixing in final stage in mixer. The blend will be smoothed out while rolling the dough for cutting. Roll on lightly floured cooky cloth to prevent sticking during cutting.

Use coconut 1 in. or less in length.

Formula from General Foods Sales Co., Inc.

FORMULA NO. 213

## Macaroon Cup Cakes

| | |
|---|---|
| Egg whites | 5 lb. |
| Granulated sugar | 9 lb. |
| Salt | ¾ oz. |
| Cream of tartar | 1 oz. |
| Vanilla extract | 1 av. oz. |
| Macaroon coconut | 5 lb. 10 oz. |
| White flour | 5 oz. |

### *Working Directions*

Whip egg whites to a wet peak, but not quite as stiff as for angel food. Mix 4 lb. of granulated sugar with the salt, cream of tartar, and vanilla. Add mixture to the beaten whites. Do not overbeat. Mix remaining 5 lb. of granulated sugar with the macaroon coconut and white flour. Fold in gently, either by hand or by machine.

### *Baking*

Use crinkled parchment cup cake liners in standard cup cape pans. Measure 15 to 16 oz. per doz. cups. Bake approximately 20 to 25 minutes at 350 deg. F. For variety place pieces of candied fruit or nuts on top of the batter before baking.

For commercial production the egg whites should be 75 deg. F. Hand finishing of mixing is recommended.

Formula from General Food Sales Co., Inc.

FORMULA NO. 214

## Canned Smoked Salmon

The salmon is first dressed, cleaned and washed well as soon as practicable after being removed from the water.

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When dressing remove heads, tails, fins, viscera and some of the scales. After partially removing the scales, split into two separate sides, after which the backbone is removed entirely, but the skin is left on. Next the nape is cut off as neatly as possible.

The blood is squeezed out of the veins in the belly flaps of pink and jack spring salmon in a way similar to that practiced in preparing mild-cured salmon. However, in the case of steelhead salmon, which has harder bones than the two other varieties, the ribs are also removed, cutting away as little of the flesh as possible. This makes it easier to cut this fish up when it is finally packed in cans, and also permits more salt to penetrate into the sides when they are being brined.

The brine used is 80 deg. sal. (20 percent by weight), with an immersion of 25 to 30 minutes for the pink and jack salmon and from 30 to 40 minutes for the steelhead. It is good practice to chill the brine before use. After brining, the sides are allowed to drain for a few minutes on a ½-in. mesh galvanized-wire tray on which they are smoked skin down.

No drying is deemed necessary. However, the smokehouse is heated up to 100 to 110 deg. F., which results in the fairly low relative humidity desired. The fish are smoked for 2½ to 3 hours at temperatures between 100 to 110 deg. F., using alder, birch or hemlock sawdust. The fish are cold when the smoking process begins, and due to the relatively low temperature and short smoking period they are not cooked at all, but merely softened to the extent that it makes them rather difficult to handle. As soon as the smoking is finished, the sides are cooled back down to 35 to 38 deg. F.

After cooling, the sides are cut into steaks about 1½ in. thick and packed vertically in 1-lb. oval cans. The cans are then exhausted, with the lids left on loosely, for about 12 minutes at 210 deg. F., and after sealing are cooked for 1½ hours at 240 deg. F., followed by immediate cooling.

Formula from P. A. Sunderland, Pacific Fisheries Experimental Station, Prince Rupert, B. C.

FORMULA NO. 215

## Pineapple Marmalade

This is prepared from grated pineapple and green sour apples (say, 40 lb. of the former and 10 lb. of the latter). Chop the apples and simmer gently with 3 gal. of water for 30 minutes. Then pass through a filter. Add 1 gal. of water to the juice and run into a steam pan; add an amount of sugar equal in weight to the fruit (i.e., 50 lb.) and bring to boiling point. Cut off the steam and allow to stand for five

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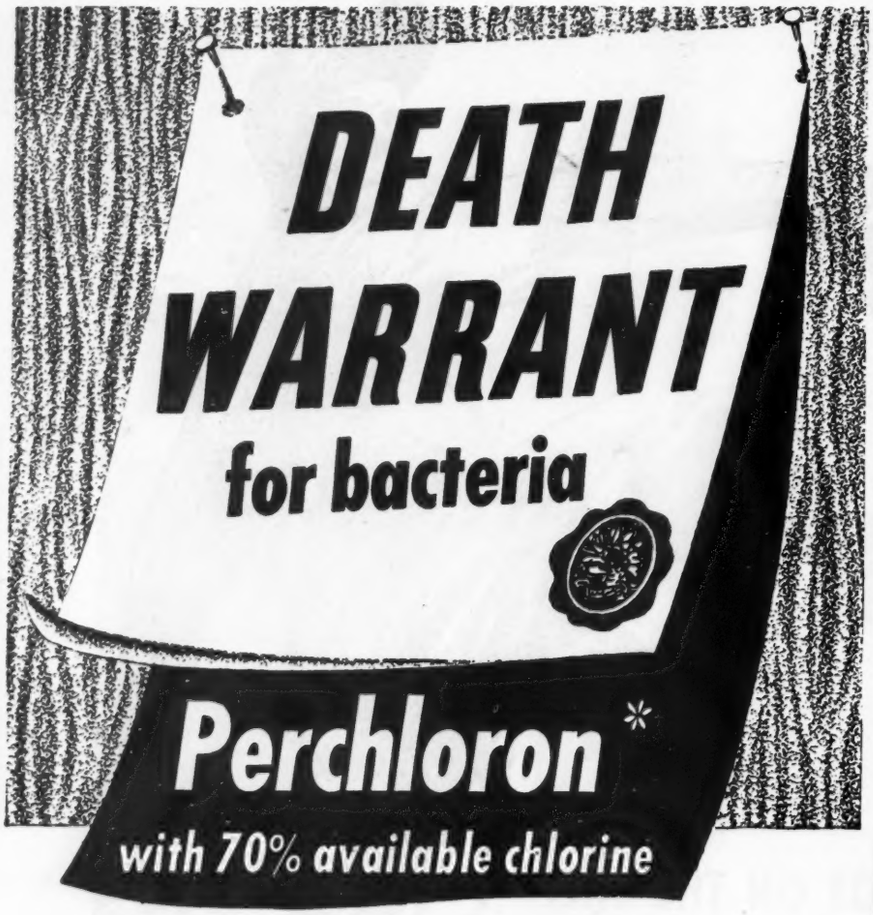


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minutes. Filter (or skim well) and add the grated pineapple. Gently boil to 223 to 223½ deg. F. Add color to impart the required shade. Fill at about 200 deg. F.

See also General Directions, Formula No. 205.

Formula from H. B. Cronshaw, London, England.

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FORMULA NO. 216

## Lemon Jelly Marmalade

Here the process is the same as for ordinary jelly marmalade. About one-third of the lemon peel is shredded, the rest being employed for making candied peel or for other purposes.

See also General Directions, Formula No. 205.

Formula from H. B. Cronshaw, London, England.

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FORMULA NO. 217

## Tangarine Marmalade

This is made in much the same way as ordinary jelly marmalade. About one-third of the orange dummies used should be tangarines.

See also General Directions, Formula No. 205.

Formula from H. B. Cronshaw, London, England.

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FORMULA NO. 218

## Apple-raspberry Juice

### A New Product

| | Percent |
|---|---|
| Apple juice, natural—Baldwin, Northern Spy, Cortland Blend | 75.8 |
| Black Bristol raspberry juice | 10.2 |
| Purple raspberry juice | 10.2 |
| Sugar | 3.8 |
| | 100.0 |

### *Directions*

Freeze the whole raspberries with 10 percent added sugar. Press in fall in an ordinary apple juice press immediately before pressing apples. Blend freshly pressed apple juice with raspberry juice, strain, deaerate, flash pasteurize, fill hot into No. 2 tall (30-oz.) cans lined with "berry" enamel, or into hot bottles; close and lay on side for 3 minutes. Cool in cold water. Apple juice should be prepared according to Circular No. 181 by the New York State Agricultural Experiment Station, Geneva, N. Y.

Formula from C. S. Pederson and H. G. Beattie, New York State Agricultural Experiment Station, Geneva, N. Y.